

ORDER FOR SUPPLIES OR SERVICES

PAGE OF PAGES

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IMPORTANT: Mark all packages and papers with contract and/or order numbers.

1. DATE OF ORDER 09/27/2019		2. CONTRACT NO. (If any) 68HE0H18D0008		6. SHIP TO: a. NAME OF CONSIGNEE OCSPP RIOS	
3. ORDER NO. 68HERH19F0248		4. REQUISITION/REFERENCE NO. See Schedule			
5. ISSUING OFFICE (Address correspondence to) HQAD US Environmental Protection Agency William Jefferson Clinton Building 1200 Pennsylvania Avenue, N. W. Mail Code: 3803R Washington DC 20460				b. STREET ADDRESS USEPA OCSPP (Division) (MC:) (RM:) William Jefferson Clinton Bldg. 1200 Pennsylvania Avenue, NW	
				c. CITY Washington	e. ZIP CODE 20004
7. TO: Kaitlin Hayes				f. SHIP VIA	
a. NAME OF CONTRACTOR Research Triangle Institute				8. TYPE OF ORDER	
b. COMPANY NAME				<input type="checkbox"/> a. PURCHASE <input checked="" type="checkbox"/> b. DELIVERY REFERENCE YOUR: _____ Please furnish the following on the terms and conditions specified on both sides of this order and on the attached sheet, if anv. including delivery as indicated.	
c. STREET ADDRESS PO BOX 12194				Except for billing instructions on the reverse, this delivery order is subject to instructions contained on this side only of this form and is issued subject to the terms and conditions of the above-numbered contract.	
d. CITY RESEARCH TRIANGLE PARK		e. STATE NC	f. ZIP CODE 277092194		
9. ACCOUNTING AND APPROPRIATION DATA See Schedule				10. REQUISITIONING OFFICE	

11. BUSINESS CLASSIFICATION (Check appropriate box(es)) <input type="checkbox"/> a. SMALL <input checked="" type="checkbox"/> b. OTHER THAN SMALL <input type="checkbox"/> c. DISADVANTAGED <input type="checkbox"/> d. WOMEN-OWNED <input type="checkbox"/> e. HUBZone <input type="checkbox"/> f. SERVICE-DISABLED <input type="checkbox"/> g. WOMEN-OWNED SMALL BUSINESS (WOSB) <input type="checkbox"/> h. EDWOSB VETERAN-OWNED ELIGIBLE UNDER THE WOSB PROGRAM				12. F.O.B. POINT	
13. PLACE OF a. INSPECTION Destination		b. ACCEPTANCE Destination		14. GOVERNMENT B/L NO.	
				15. DELIVER TO F.O.B. POINT ON OR BEFORE (Date)	
				16. DISCOUNT TERMS	

17. SCHEDULE (See reverse for Rejections)

ITEM NO. (a)	SUPPLIES OR SERVICES (b)	QUANTITY ORDERED (c)	UNIT (d)	UNIT PRICE (e)	AMOUNT (f)	QUANTITY ACCEPTED (g)
	DUNS Number: 004868105+7709 TOCOR: Kristan Markey Max Expire Date: 09/26/2023 Invoice Approver: Kristan Markey Continued ...					

SEE BILLING INSTRUCTIONS ON REVERSE	18. SHIPPING POINT		19. GROSS SHIPPING WEIGHT		20. INVOICE NO.		17(h) TOTAL (Cont. pages)
	21. MAIL INVOICE TO:						
	a. NAME RTP Finance Center						\$18,353,597.00
	b. STREET ADDRESS (or P.O. Box) US Environmental Protection Agency RTP-Finance Center (AA216-01) 109 TW Alexander Drive www2.epa.gov/financial/contracts						
c. CITY Durham				d. STATE NC	e. ZIP CODE 27711		17(i) GRAND TOTAL

22. UNITED STATES OF
AMERICA BY (Signature)

23. NAME (Typed)
Jody Gosnell
TITLE: CONTRACTING/ORDERING OFFICER

ORDER FOR SUPPLIES OR SERVICES
SCHEDULE - CONTINUATION

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IMPORTANT: Mark all packages and papers with contract and/or order numbers.

DATE OF ORDER 09/27/2019	CONTRACT NO. 68HE0H18D0008	ORDER NO. 68HERH19F0248
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ITEM NO. (a)	SUPPLIES/SERVICES (b)	QUANTITY ORDERED (c)	UNIT (d)	UNIT PRICE (e)	AMOUNT (f)	QUANTITY ACCEPTED (g)
0001	<p>Admin Office: HQAD US Environmental Protection Agency William Jefferson Clinton Building 1200 Pennsylvania Avenue, N. W. Mail Code: 3803R Washington DC 20460 Period of Performance: 09/27/2019 to 09/26/2021</p> <p>Technical Support for the Development and Implementation of Pathway-Based Systematic Reviews, Universe of Chemicals, and Scientific IT Platform</p> <p>Base Period: 09/27/19 - 09/26/2021</p> <p>Task 1 - TO Management Task 2 - QAPP Task 3.1.1 - Thyroid Systematic Review Base (15k Articles) Task 3.3.1 - Ontology Mapping Base: 500 IRIS Endpoint + 500 End Terms Task 3.4.1 - Literature Mining Base: Thyroid MIEs (x5) Task 3.5.1 - Templates and Workflows Base: Thyroids MIEs (5x5) Task 4.1.1 - Chemical Clustering Base Task 4.2.1 - Integration of Diverse Metrics Base Task 4.3.1 - EDSP Relevant Bioactivity Models Base Requisition No: PR-OCSPP-19-00263, PR-OCSPP-19-00331, PR-OCSPP-19-00464</p> <p>Accounting Info: 18-19-B-C2A00EA-000C54-2505-19C20SE010 -001 BFY: 18 EFY: 19 Fund: B Budget Org: C2A00EA Program (PRC): 000C54 Budget (BOC): 2505 DCN - Line ID: 19C20SE010-001 Funding Flag: Partial Funded: \$2,256,789.87 Accounting Info: 19-20-B-C2A00EA-000C54-2505-19C20SE010 -002 BFY: 19 EFY: 20 Fund: B Budget Continued ...</p>				3,419,895.00	
TOTAL CARRIED FORWARD TO 1ST PAGE (ITEM 17(H))					\$3,419,895.00	

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SCHEDULE - CONTINUATION

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IMPORTANT: Mark all packages and papers with contract and/or order numbers.

DATE OF ORDER 09/27/2019	CONTRACT NO. 68HE0H18D0008	ORDER NO. 68HERH19F0248
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ITEM NO. (a)	SUPPLIES/SERVICES (b)	QUANTITY ORDERED (c)	UNIT (d)	UNIT PRICE (e)	AMOUNT (f)	QUANTITY ACCEPTED (g)
	Org: C2A00EA Program (PRC): 000C54 Budget (BOC): 2505 DCN - Line ID: 19C2OSE010-002 Funding Flag: Partial Funded: \$1,001,543.13 Accounting Info: 18-19-B-C2A00EA-000C54-2505-19C2OSE008 -001 BFY: 18 EFY: 19 Fund: B Budget Org: C2A00EA Program (PRC): 000C54 Budget (BOC): 2505 DCN - Line ID: 19C2OSE008-001 Funding Flag: Partial Funded: \$145,803.00 Accounting Info: 19-20-B-C2A00EA-000C54-2505-19C2OSE013 -001 BFY: 19 EFY: 20 Fund: B Budget Org: C2A00EA Program (PRC): 000C54 Budget (BOC): 2505 DCN - Line ID: 19C2OSE013-001 Funding Flag: Partial Funded: \$15,759.00					
0002	Task 3.1.2a - Thyroid Pathway Evidence Mapping Option (5k articles) - OPTIONAL TASK Base Period: 09/27/19 - 09/26/2021 This line item is priced as a cumulative total and can be exercised once in the Base Period. (Option Line Item) 09/25/2021				354,155.00	
0003	Task 3.1.2b - Thyroid Pathway Complete Extraction Option (500 articles) - OPTIONAL TASK Base Period: 09/27/19 - 09/26/2021 This line item is priced as a cumulative total and can be exercised once in the Base Period. (Option Line Item) 09/25/2021				390,770.00	
0004	Task 3.2.2a - Steroidogenesis Pathway Evidence Mapping Option (5k articles) - OPTIONAL TASK Continued ...				819,298.00	

TOTAL CARRIED FORWARD TO 1ST PAGE (ITEM 17(H))

\$1,564,223.00

ORDER FOR SUPPLIES OR SERVICES
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DATE OF ORDER 09/27/2019	CONTRACT NO. 68HE0H18D0008	ORDER NO. 68HERH19F0248
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ITEM NO. (a)	SUPPLIES/SERVICES (b)	QUANTITY ORDERED (c)	UNIT (d)	UNIT PRICE (e)	AMOUNT (f)	QUANTITY ACCEPTED (g)
	Base Period: 09/27/19 - 09/26/2021 This line item is priced as a cumulative total and can be exercised once in the Base Period. (Option Line Item) 09/25/2021					
0005	Task 3.2.2b - Steroidogenesis Pathway Complete Extraction Option (500 articles) - OPTIONAL TASK Base Period: 09/27/19 - 09/26/2021 This line item is priced as a cumulative total and can be exercised once in the Base Period. (Option Line Item) 09/25/2021				1,281,233.00	
0006	Task 3.3.2 - Ontology Mapping: AOP Visualization Tool - OPTIONAL TASK Base Period: 09/27/19 - 09/26/2021 (Option Line Item) 09/25/2021				92,751.00	
0007	Task 3.3.2.1 - Ontology Mapping: AOP Component - OPTIONAL TASK Base Period: 09/27/19 - 09/26/2021 (Option Line Item) 09/25/2021				44,431.00	
0008	Task 3.3.2.2 - Ontology Mapping: 10k IRIS Endpoints - OPTIONAL TASK Base Period: 09/27/19 - 09/26/2021 (Option Line Item) 09/25/2021				46,701.00	
0009	Task 3.3.2.3 - Ontology Mapping and Term Extraction: EDSP Relevant Title and Abstract - OPTIONAL TASK Base Period: 09/27/19 - 09/26/2021 (Option Line Item) 09/25/2021 Continued ...				118,336.00	

TOTAL CARRIED FORWARD TO 1ST PAGE (ITEM 17(H))

\$1,583,452.00

ORDER FOR SUPPLIES OR SERVICES

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IMPORTANT: Mark all packages and papers with contract and/or order numbers.

DATE OF ORDER	CONTRACT NO.	ORDER NO.
09/27/2019	68HE0H18D0008	68HERH19F0248

ITEM NO. (a)	SUPPLIES/SERVICES (b)	QUANTITY ORDERED (c)	UNIT (d)	UNIT PRICE (e)	AMOUNT (f)	QUANTITY ACCEPTED (g)
0010	Task 3.3.2.4 - Ontology Mapping: Study Tool (500 - 1000 EDSP Endpoints) - OPTIONAL TASK Base Period: 09/27/19 - 09/26/2021 (Option Line Item) 09/25/2021				68,087.00	
0011	Task 3.3.2.5 - Ontology Mapping: Additional Quantities (1k Terms) - OPTIONAL TASK Base Period: 09/27/19 - 09/26/2021 (Option Line Item) 09/25/2021				51,488.00	
0012	Task 3.4.2 - Literature Mining: Thyroid MIEs (Per EPA Request) - OPTIONAL TASK Base Period: 09/27/19 - 09/26/2021 (Option Line Item) 09/25/2021				42,993.00	
0013	Task 3.4.3 - Literature Mining: Tool Integration - OPTIONAL TASK Base Period: 09/27/19 - 09/26/2021 (Option Line Item) 09/25/2021				125,825.00	
0014	Task 3.4.4 - Meta Analysis and Regression: (Per MIE) - OPTIONAL TASK Base Period: 09/27/19 - 09/26/2021 (Option Line Item) 09/25/2021				70,850.00	
0015	Task 3.4.5 - Literature Mining: Semantic Network - OPTIONAL TASK Base Period: 09/27/19 - 09/26/2021 (Option Line Item) 09/25/2021				104,219.00	
0016	Task 3.4.6 - Literature Mining: Expanded Full Text Parsing - OPTIONAL TASK Continued ...				96,370.00	

TOTAL CARRIED FORWARD TO 1ST PAGE (ITEM 17(H))

\$559,832.00

ORDER FOR SUPPLIES OR SERVICES
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DATE OF ORDER 09/27/2019	CONTRACT NO. 68HE0H18D0008	ORDER NO. 68HERH19F0248
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ITEM NO. (a)	SUPPLIES/SERVICES (b)	QUANTITY ORDERED (c)	UNIT (d)	UNIT PRICE (e)	AMOUNT (f)	QUANTITY ACCEPTED (g)
	Base Period: 09/27/19 - 09/26/2021 (Option Line Item) 09/25/2021					
0017	Task 3.5.2 - Templates and Workflows: Thyroids MIEs (Per EPA Request) - OPTIONAL TASK Base Period: 09/27/19 - 09/26/2021 (Option Line Item) 09/25/2021				27,248.00	
0018	Task 4.1.2 - Chemical Clustering Optional Quantities - OPTIONAL TASK Base Period: 09/27/19 - 09/26/2021 (Option Line Item) 09/25/2021				97,816.00	
0019	Task 4.2.2 - Integration of Diverse Metrics Option Quantities - OPTIONAL TASK Base Period: 09/27/19 - 09/26/2021 (Option Line Item) 09/25/2021				108,340.00	
0020	Optional AWS Services for Optional Activity Exercise - OPTIONAL TASK Base Period: 09/27/2019 - 09/26/2021 (Option Line Item) 09/25/2021				19,997.00	
0021	Technical Support for the Development and Implementation of Pathway-Based Systematic Reviews, Universe of Chemicals, and Scientific IT Platform Option Period 1: 09/27/21 - 09/26/2022 Task 1 - TO Management Task 2 - QAPP (Option Line Item) 09/20/2021 Continued ...				120,555.00	

TOTAL CARRIED FORWARD TO 1ST PAGE (ITEM 17(H))

\$373,956.00

ORDER FOR SUPPLIES OR SERVICES
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DATE OF ORDER 09/27/2019	CONTRACT NO. 68HE0H18D0008	ORDER NO. 68HERH19F0248
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ITEM NO. (a)	SUPPLIES/SERVICES (b)	QUANTITY ORDERED (c)	UNIT (d)	UNIT PRICE (e)	AMOUNT (f)	QUANTITY ACCEPTED (g)
0022	Task 3.1.2a - Thyroid Pathway Evidence Mapping Option (5k articles) - OPTIONAL TASK Option Period 1: 09/27/21 - 09/26/2022 This line item is priced as a cumulative total and can be exercised up to three (3) times in Option Period 1. (Option Line Item) 09/25/2022				799,801.00	
0023	Task 3.1.2b - Thyroid Pathway Complete Extraction Option (500 articles) - OPTIONAL TASK Option Period 1: 09/27/21 - 09/26/2022 This line item is priced as a cumulative total and can be exercised up to three (3) times in Option Period 1. (Option Line Item) 09/25/2022				1,234,490.00	
0024	Task 3.2.2a - Steroidogenesis Pathway Evidence Mapping Option (5k articles) - OPTIONAL TASK Option Period 1: 09/27/21 - 09/26/2022 This line item is priced as a cumulative total and can be exercised up to three (3) times in Option Period 1. (Option Line Item) 09/25/2022				799,801.00	
0025	Task 3.2.2b - Steroidogenesis Pathway Complete Extraction Option (500 articles) - OPTIONAL TASK Option Period 1: 09/27/21 - 09/26/2022 This line item is priced as a cumulative total and can be exercised up to three (3) times in Option Period 1. (Option Line Item) 09/25/2022				1,248,709.00	
0026	Task 3.3.2 - Ontology Mapping: AOP Visualization Tool - OPTIONAL TASK Continued ...				98,514.00	

TOTAL CARRIED FORWARD TO 1ST PAGE (ITEM 17(H))

\$4,181,315.00

ORDER FOR SUPPLIES OR SERVICES
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DATE OF ORDER 09/27/2019	CONTRACT NO. 68HE0H18D0008	ORDER NO. 68HERH19F0248
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ITEM NO. (a)	SUPPLIES/SERVICES (b)	QUANTITY ORDERED (c)	UNIT (d)	UNIT PRICE (e)	AMOUNT (f)	QUANTITY ACCEPTED (g)
	Option Period 1: 09/27/21 - 09/26/2022 (Option Line Item) 09/25/2022					
0027	Task 3.3.2.1 - Ontology Mapping: AOP Component - OPTIONAL TASK Option Period 1: 09/27/21 - 09/26/2022 (Option Line Item) 09/25/2022				47,192.00	
0028	Task 3.3.2.2 - Ontology Mapping: 10k IRIS Endpoints - OPTIONAL TASK Option Period 1: 09/27/21 - 09/26/2022 (Option Line Item) 09/25/2022				49,603.00	
0029	Task 3.3.2.3 - Ontology Mapping and Term Extraction: EDSP Relevant Title and Abstract - OPTIONAL TASK Option Period 1: 09/27/21 - 09/26/2022 (Option Line Item) 09/25/2022				125,689.00	
0030	Task 3.3.2.4 - Ontology Mapping: Study Tool (500 - 1000 EDSP Endpoints) - OPTIONAL TASK Option Period 1: 09/27/21 - 09/26/2022 (Option Line Item) 09/25/2022				72,318.00	
0031	Task 3.3.2.5 - Ontology Mapping: Additional Quantities (1k Terms) - OPTIONAL TASK Option Period 1: 09/27/21 - 09/26/2022 (Option Line Item) 09/25/2022				54,687.00	
0032	Task 3.4.2 - Literature Mining: Thyroid MIEs (Per EPA Request) - OPTIONAL TASK Option Period 1: 09/27/21 - 09/26/2022 (Option Line Item) 09/25/2022 Continued ...				45,665.00	

TOTAL CARRIED FORWARD TO 1ST PAGE (ITEM 17(H))

\$395,154.00

ORDER FOR SUPPLIES OR SERVICES

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SCHEDULE - CONTINUATION

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DATE OF ORDER	CONTRACT NO.	ORDER NO.
09/27/2019	68HE0H18D0008	68HERH19F0248

ITEM NO. (a)	SUPPLIES/SERVICES (b)	QUANTITY ORDERED (c)	UNIT (d)	UNIT PRICE (e)	AMOUNT (f)	QUANTITY ACCEPTED (g)
0033	Task 3.4.3 - Literature Mining: Tool Integration - OPTIONAL TASK Option Period 1: 09/27/21 - 09/26/2022 (Option Line Item) 09/25/2022				133,643.00	
0034	Task 3.4.4 - Meta Analysis and Regression: (Per MIE) - OPTIONAL TASK Option Period 1: 09/27/21 - 09/26/2022 (Option Line Item) 09/25/2022				75,252.00	
0035	Task 3.4.5 - Literature Mining: Semantic Network - OPTIONAL TASK Option Period 1: 09/27/21 - 09/26/2022 (Option Line Item) 09/25/2022				110,694.00	
0036	Task 3.4.6 - Literature Mining: Expanded Full Text Parsing - OPTIONAL TASK Option Period 1: 09/27/21 - 09/26/2022 (Option Line Item) 09/25/2022				102,358.00	
0037	Task 3.5.2 - Templates and Workflows: Thyroids MIEs (Per EPA Request) - OPTIONAL TASK Option Period 1: 09/27/21 - 09/26/2022 (Option Line Item) 09/25/2022				28,941.00	
0038	Task 3.5.3 - Templates and Workflows: Steroidogenesis Targets (Per EPA Request) - OPTIONAL TASK Option Period 1: 09/27/21 - 09/26/2022 (Option Line Item) 09/25/2022 Continued ...				28,941.00	
TOTAL CARRIED FORWARD TO 1ST PAGE (ITEM 17(H))					\$479,829.00	

ORDER FOR SUPPLIES OR SERVICES
SCHEDULE - CONTINUATION

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IMPORTANT: Mark all packages and papers with contract and/or order numbers.

DATE OF ORDER 09/27/2019	CONTRACT NO. 68HE0H18D0008	ORDER NO. 68HERH19F0248
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ITEM NO. (a)	SUPPLIES/SERVICES (b)	QUANTITY ORDERED (c)	UNIT (d)	UNIT PRICE (e)	AMOUNT (f)	QUANTITY ACCEPTED (g)
0039	Task 4.1.2 - Chemical Clustering Optional Quantities - OPTIONAL TASK Option Period 1: 09/27/21 - 09/26/2022 (Option Line Item) 09/25/2022				103,288.00	
0040	Task 4.2.2 - Integration of Diverse Metrics Option Quantities - OPTIONAL TASK Option Period 1: 09/27/21 - 09/26/2022 (Option Line Item) 09/25/2022				114,466.00	
0041	Optional AWS Services for Optional Activity Exercise - OPTIONAL TASK Option Period 1: 09/27/2021 - 09/26/2022 (Option Line Item) 09/25/2022				19,997.00	
0042	Technical Support for the Development and Implementation of Pathway-Based Systematic Reviews, Universe of Chemicals, and Scientific IT Platform Option Period 2: 09/27/22 - 09/26/2023 Task 1 - TO Management Task 2 - QAPP (Option Line Item) 09/20/2022				124,244.00	
0043	Task 3.1.2a - Thyroid Pathway Evidence Mapping Option (5k articles) - OPTIONAL TASK Option Period 2: 09/27/2022 - 09/26/2023 This line item is priced as a cumulative total and can be exercised up to three (3) times in Option Period 2. (Option Line Item) 09/26/2023				819,298.00	
0044	Task 3.1.2b - Thyroid Pathway Complete Extraction Option (500 articles) - OPTIONAL Continued ...				1,267,014.00	

TOTAL CARRIED FORWARD TO 1ST PAGE (ITEM 17(H))

\$2,448,307.00

ORDER FOR SUPPLIES OR SERVICES

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SCHEDULE - CONTINUATION

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DATE OF ORDER	CONTRACT NO.	ORDER NO.
09/27/2019	68HE0H18D0008	68HERH19F0248

ITEM NO. (a)	SUPPLIES/SERVICES (b)	QUANTITY ORDERED (c)	UNIT (d)	UNIT PRICE (e)	AMOUNT (f)	QUANTITY ACCEPTED (g)
	TASK Option Period 2: 09/27/2022 - 09/26/2023 This line item is priced as a cumulative total and can be exercised up to three (3) times in Option Period 2. (Option Line Item) 09/26/2023					
0045	Task 3.2.2a - Steroidogenesis Pathway Evidence Mapping Option (5k articles) - OPTIONAL TASK Option Period 2: 09/27/2022 - 09/26/2023 This line item is priced as a cumulative total and can be exercised up to three (3) times in Option Period 2. (Option Line Item) 09/26/2023				819,298.00	
0046	Task 3.2.2b - Steroidogenesis Pathway Complete Extraction Option (500 articles) - OPTIONAL TASK Option Period 2: 09/27/2022 - 09/26/2023 This line item is priced as a cumulative total and can be exercised up to three (3) times in Option Period 2. (Option Line Item) 09/26/2023				1,281,233.00	
0047	Task 3.3.2 - Ontology Mapping: AOP Visualization Tool - OPTIONAL TASK Option Period 2: 09/27/2022 - 09/26/2023 (Option Line Item) 09/26/2023				101,529.00	
0048	Task 3.3.2.1 - Ontology Mapping: AOP Component - OPTIONAL TASK Option Period 2: 09/27/2022 - 09/26/2023 (Option Line Item) 09/26/2023				48,636.00	
0049	Task 3.3.2.2 - Ontology Mapping: 10k IRIS Continued ...				51,121.00	

TOTAL CARRIED FORWARD TO 1ST PAGE (ITEM 17(H))

\$2,301,817.00

ORDER FOR SUPPLIES OR SERVICES
SCHEDULE - CONTINUATION

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DATE OF ORDER 09/27/2019	CONTRACT NO. 68HE0H18D0008	ORDER NO. 68HERH19F0248
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ITEM NO. (a)	SUPPLIES/SERVICES (b)	QUANTITY ORDERED (c)	UNIT (d)	UNIT PRICE (e)	AMOUNT (f)	QUANTITY ACCEPTED (g)
	Endpoints - OPTIONAL TASK Option Period 2: 09/27/2022 - 09/26/2023 (Option Line Item) 09/26/2023					
0050	Task 3.3.2.3 - Ontology Mapping and Term Extraction: EDSP Relevant Title and Abstract - OPTIONAL TASK Option Period 2: 09/27/2022 - 09/26/2023 (Option Line Item) 09/26/2023				129,535.00	
0051	Task 3.3.2.4 - Ontology Mapping: Study Tool (500 - 1000 EDSP Endpoints) - OPTIONAL TASK Option Period 2: 09/27/2022 - 09/26/2023 (Option Line Item) 09/26/2023				74,531.00	
0052	Task 3.3.2.5 - Ontology Mapping: Additional Quantities (1k Terms) - OPTIONAL TASK Option Period 2: 09/27/2022 - 09/26/2023 (Option Line Item) 09/26/2023				56,361.00	
0053	Task 3.4.2 - Literature Mining: Thyroid MIEs (Per EPA Request) - OPTIONAL TASK Option Period 2: 09/27/2022 - 09/26/2023 (Option Line Item) 09/26/2023				47,062.00	
0054	Task 3.4.3 - Literature Mining: Tool Integration - OPTIONAL TASK Option Period 2: 09/27/2022 - 09/26/2023 (Option Line Item) 09/26/2023				137,732.00	
0055	Task 3.4.4 - Meta Analysis and Regression: (Per MIE) - OPTIONAL TASK Option Period 2: 09/27/2022 - 09/26/2023 (Option Line Item) Continued ...				77,555.00	

TOTAL CARRIED FORWARD TO 1ST PAGE (ITEM 17(H))

\$522,776.00

ORDER FOR SUPPLIES OR SERVICES
SCHEDULE - CONTINUATION

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IMPORTANT: Mark all packages and papers with contract and/or order numbers.

DATE OF ORDER 09/27/2019	CONTRACT NO. 68HE0H18D0008	ORDER NO. 68HERH19F0248
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ITEM NO. (a)	SUPPLIES/SERVICES (b)	QUANTITY ORDERED (c)	UNIT (d)	UNIT PRICE (e)	AMOUNT (f)	QUANTITY ACCEPTED (g)
	09/26/2023					
0056	Task 3.4.5 - Literature Mining: Semantic Network - OPTIONAL TASK Option Period 2: 09/27/2022 - 09/26/2023 (Option Line Item) 09/26/2023				114,082.00	
0057	Task 3.4.6 - Literature Mining: Expanded Full Text Parsing - OPTIONAL TASK Option Period 2: 09/27/2022 - 09/26/2023 (Option Line Item) 09/26/2023				105,490.00	
0058	Task 3.5.2 - Templates and Workflows: Thyroids MIEs (Per EPA Request) - OPTIONAL TASK Option Period 2: 09/27/2022 - 09/26/2023 (Option Line Item) 09/26/2023				29,826.00	
0059	Task 3.5.3 - Templates and Workflows: Steroidogenesis Targets (Per EPA Request) - OPTIONAL TASK Option Period 2: 09/27/2022 - 09/26/2023 (Option Line Item) 09/25/2022				29,826.00	
0060	Task 4.1.2 - Chemical Clustering Optional Quantities - OPTIONAL TASK Option Period 2 09/27/2022 - 09/26/2023 (Option Line Item) 09/26/2023				106,150.00	
0061	Task 4.2.2 - Integration of Diverse Metrics Option Quantities - OPTIONAL TASK Option Period 2: 09/27/2022 - 09/26/2023 (Option Line Item) 09/26/2023 Continued ...				117,670.00	
TOTAL CARRIED FORWARD TO 1ST PAGE (ITEM 17(H))					\$503,044.00	

ORDER FOR SUPPLIES OR SERVICES
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IMPORTANT: Mark all packages and papers with contract and/or order numbers.

DATE OF ORDER
09/27/2019

CONTRACT NO.
68HE0H18D0008

ORDER NO.
68HERH19F0248

ITEM NO. (a)	SUPPLIES/SERVICES (b)	QUANTITY ORDERED (c)	UNIT (d)	UNIT PRICE (e)	AMOUNT (f)	QUANTITY ACCEPTED (g)
0062	Optional AWS Services for Optional Activity Exercise - OPTIONAL TASK Option Period 2: 09/27/2022 - 09/26/2023 (Option Line Item) 09/26/2023				19,997.00	

TOTAL CARRIED FORWARD TO 1ST PAGE (ITEM 17(H))

\$19,997.00



ENVIRONMENTAL PROTECTION AGENCY

Request for Task Order Proposal (RFTOP)

68HERH19Q00107 (TO 4)

1 PERFORMANCE WORK STATEMENT (PWS)

1.1 PURPOSE

The purpose of this task order (TO), EPA Office of Science and Coordination Policy: *Technical Support for the Development and Implementation of Pathway-Based Systematic Reviews, Universe of Chemicals, and Scientific IT Platform*, will provide technical support to the Office of Science Coordination and Policy (OSCP), Office of Chemical Safety & Pollution Prevention (OCSPP) in two (2) general areas:

1. Task 3. Pathway Based Systematic Reviews and Evidence Mapping
2. Task 4. Clustering, prioritizing, and evaluating of the EDSP Universe of Chemicals 3.0

1.2 BACKGROUND

The Office of Science and Coordination Policy (OSCP) manages EPA's Endocrine Disruptor Screening Program (EDSP) and two federal advisory committees, FIFRA Scientific Advisory Panel and the TSCA Science Advisory Committee on Chemicals.

The Endocrine Disruptor Screening Program (EDSP) was established in 1998 under authorities contained in the 1996 *Food Quality Protection Act* (FQPA) and the 1996 *Safe Drinking Water Act* (SDWA) amendments. As mandated by these statutes, the EDSP develops a screening program to determine whether certain substances may have endocrine activity in humans and wildlife. The US EPA has developed a two-tiered approach for screening chemicals and pesticides. The Tier 1 battery is used to identify substances that have potential to interact with the estrogen, androgen or thyroid hormone pathways. The Tier 2 tests identify and establish dose response information for adverse effects for substances identified in the Tier 1 screening. Beginning in 2015, the EDSP is incorporating ToxCast high throughput screening data and computational models in the prioritization and screening of a chemical's potential to interact with the endocrine system in humans and wildlife for a portion of the Tier 1 battery. This approach will allow nearly 20 times the current number of screenings to be performed while dramatically reducing animal testing, allowing the Agency to meet its goals with a relatively level budget.

The EPA's EDSP is continuing the development and validation of alternative testing methodologies (i.e., high throughput assays and computational tools) to prioritize and screen chemicals based on potential endocrine bioactivity and exposure--in particular, the estrogen, androgen, or thyroid hormone pathways in humans and wildlife. This increased use of alternative testing methodologies will improve the output of screening results, allowing for greater biological coverage of the endocrine system.

1.3 TASK 1: TASK ORDER MANAGEMENT AND REPORTING REQUIREMENTS

- 1.3.1 The Contractor shall schedule a kick-off meeting/conference call with the TOCOR within 10 business days following the TO award. The TOCOR, Alternate (Alt) TOCOR, contract-level COR, and the EPA Contracting Officer (CO) must be invited to the kick-off meeting. Additional participants may be included.
- 1.3.2 The Contractor shall manage all aspects of the task order including, but not limited to, the technical, quality assurance, schedule, cost, and communication requirements.

- 1.3.3 The Contractor shall only work on tasks in the Performance Work Statement as directed by the TOCOR. The TOCOR shall identify specific due dates for deliverables for Tasks 3-4 via technical direction. Technical direction will be provided in writing by the Contracting Officer or the TOCOR as delegated by the Contracting Officer.
- 1.3.4 The Contractor shall schedule at least biweekly meetings (teleconference, in-person, Skype, Adobe Connect, or other media) with the TOCOR to discuss the status of the work including reporting any issues with respect to schedule slip or cost overruns. The TOCOR will identify, as needed, other individuals who should participate in these calls. Additional teleconference calls may be scheduled by the TOCOR as needed. Note: Telephone or in-person reports are not replacements for required written communications.
- 1.3.5 In addition to biweekly meetings, the Contractor shall update the TOCOR via telephone (and follow-up via e-mail) and, in writing, via e-mail, of any issues on an ongoing basis.
- 1.3.6 The Contractor shall immediately inform the TOCOR when any hours or costs for any task has exceeded or is expected to exceed the contractor estimate by >10%.
- 1.3.7 The Contractor shall immediately inform the TOCOR of any problems that may impact the production, budget, and/or delivery of deliverables.
- 1.3.8 The Contractor shall notify the TOCOR when 75% of the Government approved hours or approved LH (labor hour) costs have been incurred (including unbilled hours and costs).
- 1.3.9 The Contractor shall provide a monthly progress report of the combined monthly technical and financial progress report) stating the progress made, including the percentage of the project completed, a description of the work accomplished to support the cost, the estimated percentage of each task and subtask completed (including deliverables) during the reporting period. The report shall also breakout The Executive Summary shall summarize the planned and actual work for the month, financial status, work planned for the next month, and significant issues, risks, or concerns. The monthly report shall also provide cost and technical progress data for each of the defined tasks (by labor category for each task) and projected costs for the upcoming reporting period.
- For the technical progress report also include the following specific information:
 - Narrative detail review of accomplishments during the reporting period and/or significant events, as well as an assessment of work being completed on schedule and budget.
 - Status of all ongoing activities in accordance with the technical proposal and technical directives.
 - List of deliverables with delivery dates (planned versus actual).
 - Anticipated activities and deliverables for the next reporting period.

- Specific discussions shall include difficulties encountered and remedial action taken during the reporting period, and anticipated activity with a schedule of deliverables for the subsequent reporting period.
 - List of current contractors / staffing roster and any changes that may impact deliverables in advance of the reporting period (e.g., change in personnel and vacations).
 - Monthly Contractor performance information (performance metrics).
- For the financial report, include the following information:
 - Identification of cost issues or concerns.
 - For the current period, display the amount claimed.
 - For the cumulative period display the total amount claimed; amount paid; amount suspended or disallowed; and remaining amount.
 - Labor hours.
 - A list of employees, their labor categories, and the number of hours worked for the reporting period.
 - For the current reporting period display the expended direct labor hours (by EPA contract labor category), and the total loaded direct labor hours.
 - For the cumulative reporting period and the cumulative contract period display: The negotiated and expended direct labor hours (by EPA labor hour category) and the loaded direct labor rate.
 - Display the estimated direct labor hours and costs to be expended during the next reporting period.
 - Display the estimates of remaining direct labor hours and costs required to complete the task order.
 - Unbilled allowable costs. Display the total costs incurred but unbilled for the current reporting period and cumulative for the task order.
 - Average total cost labor hour. For the current contract period, compare the actual total cost per hour to date with the average total cost per hour of the approved technical proposal for the task order.
 - The monthly report does not change the notification requirements of the “Limitation of Cost” or “Limitation of Funds” clauses requiring separate written notice to the Contracting Officer.
- 1.3.10 The Contractor shall maintain a cumulative record of all communications between the contractor and EPA (all media including e-mail and telephone calls) and provide it to the TOCOR within one month after the TO has ended.
- 1.3.11 The contractor shall provide all deliverables in an electronic format specified by the EPA TOCOR (e.g., Word, Excel, Access, HTML) via electronic mail. The Contractor shall format any deliverables intended for posting on an EPA public website to comply with Section 508. For cost estimates, assume that deliverables will not need to be 508 compliant. EPA will direct the contractor via technical directive on which deliverables, if any, for Tasks 3 and 4 will need to be 508 compliant for posting on EPA public websites.
- 1.3.12 Unless otherwise specified by the TOCOR, the Contractor shall provide a secure method for internet transfer of large files.

- 1.3.13 All deliverables for this task order are the property of EPA.
- 1.3.14 For Tasks 3 & 4, EPA shall provide available data and work completed to date. Contractor may propose additional approaches and data sources for EPA consideration. Any code or scripts developed, and data gathered shall be made available to EPA for eventual public release. Unless proposed by the Contractor and specifically accepted by EPA in writing, Contractor shall develop all code and scripts in Python 3.6 or R 3.5 or higher. Unless proposed by the Contractor and accepted by EPA, Contractor shall utilize open-source or freely available toolkits and libraries. The Contractor shall maintain and provide any code developed for this project in a versioning repository such as Git or BitBucket.

1.4 TASK 2. QUALITY ASSURANCE AND QUALITY ASSURANCE PROJECT PLAN (QAPP)

- 1.4.1 The Contractor shall implement a quality system that meets ANSI standard E4-2014.
- 1.4.2 For planning purposes, assume that a Quality Assurance Project Plan (QAPP) will be required for Tasks 3 and 4). The contractor shall create a Quality Assurance Project Plan (QAPP) that documents the planning, implementation, and assessment procedures for quality assurance and quality control activities. The QAPP integrates all the technical and quality aspects of the project to provide a blueprint for obtaining the type and quality of environmental data and information needed for a specific decision or use. The QAPP shall be prepared in accordance with the specifications identified by EPA (found at <https://www.epa.gov/quality/epa-qar-5-epa-requirements-quality-assurance-project-plans>).
- 1.4.3 Within 10 business days after Task Order Award, the contractor shall prepare and submit for EPA review a draft Quality Assurance Project Plan (QAPP) for Task 3 and Task 4.
- 1.4.4 EPA will review the contractor's draft QAPP and provide the Contractor with written approval or written comments within three weeks.
- 1.4.5 If needed, the Contractor shall submit a revised QAPP within 5 business days of receipt of the written comments on the draft QAPP, unless otherwise instructed by the EPA TO COR.
- 1.4.6 Under no circumstances shall work that involves the generation, collection, evaluation, analysis, or use of environmental data be performed by the contractor until the contractor receives written notification from the EPA TO COR that EPA has approved the contractor's QAPP.
- 1.4.7 All QA documentation, including the QAPP, prepared under this Task Order, shall be considered non-proprietary, and shall be made available to the public upon request.

- 1.4.8 The contractor shall also provide EPA with monthly reports of QA-related activities performed during implementation of this Task Order. These monthly QA reports shall identify QA activities performed to support implementation of this task order, problems encountered, deviations from the QAPP, and corrective actions taken.

1.5 TASK 3. PATHWAY BASED SYSTEMATIC REVIEWS AND EVIDENCE MAPPING

Overview

- 1.5.1 The Contractor shall provide technical support for EDSP pathway-based systematic literature reviews and evidence mapping. There are manifold goals of these reviews:
- Identify mechanisms of xenobiotic disruption of various hormone-related networks;
 - Identify reference chemicals with a range of potencies for model and test guideline development; and
 - Identify new test methods for further development.
- 1.5.2 In accomplishing these goals, EPA expects to develop approaches to and ultimately accomplish:
- Rapidly mapping and evaluating mechanistic evidence in the literature;
 - Identification of molecular initiating and key events (MIEs & KEs, respectively) using machine learning (ML) and natural language processing (NLP) approaches;
 - Evaluation of evidence outlining adverse outcome pathways (AOPs);
 - Building and linking ontologies, controlled vocabularies, and data formats across multiple databases and data formats; and
 - Rapidly and systematically evaluate study quality of relevant articles.
- 1.5.3 Specifically, the Contractor shall support the EPA with scientific expertise to perform title/abstract screening, full-text screening, data extraction, other annotations, template development, study quality evaluation, and evidence integration as directed by EPA on the thyroid and steroidogenesis hormone-related networks.

General requirements for Task 3

- 1.5.4 Assume EPA shall provide the contractor with licenses to use collaborative web-based systematic literature review software to accomplish the tasks (such as DistillerSR). Otherwise, the contractor should use software to which the contractor already has access and licenses or is otherwise open-source and/or free of charge. Assume that EPA shall provide reviewers' access to all PDFs via its HERO system, and that the contractor will not acquire their own copies of articles.

- 1.5.5 The contractor shall conduct each systematic literature review using at least two (2) senior (P3 or P4) scientific technical experts whose technical background is reviewed and approved by EPA as described in Paragraph 1.5.24 Subtask 3.1: Thyroid Systematic Review to Support Performance-Based Approaches and Pathway Interrogation and Paragraph 1.5.25 Subtask 3.2: Steroidogenesis Systematic Review to Support Performance-Based Approaches and Pathway Interrogation below. The contractor may identify additional senior level scientific technical experts to complete this task.
- 1.5.6 For each systematic literature review that requires the use of a non-EPA gold standard reviewer, the contractor shall identify a P4 or equivalent to provide authoritative guidance on scientific processes, results, evaluations, outcomes, and terminology.
- 1.5.7 For each systematic literature review that requires building of templates and workflows for the web-based systematic literature review software, the Contractor shall identify at least one (1) staff member with a background in programming and data management.
- 1.5.8 The contractor shall identify a project manager with a background and experience in managing systematic literature reviews and personnel to coordinate the work of all systematic review team members including the EPA team members assigned to a systematic literature review. The contractor project manager shall
- Keep the TO COR and Alternate TO COR apprised on all communications back to EPA staff.
 - Regularly report on progress and challenges for each systematic review.
 - Ensure staff availability to accomplish the systematic reviews.
- 1.5.9 The TO COR/alt TO COR shall keep the contracted project manager apprised of EPA scientific staff and roles.
- 1.5.10 The contractor shall use the web-based systematic literature review software as directed by the TO COR to complete the tasks described in this task order and other office suite software as appropriate. EPA shall provide the contractor with licenses to use the web-based systematic literature review software and all instructions to perform the work specified in this task order.
- 1.5.11 EPA shall provide reviewers access to all PDFs via its HERO system¹, and that the contractor will not acquire their own copies of articles.
- 1.5.12 For other software, the contractor shall use software to which the contractor already has access and licenses or is otherwise open-source and/or free of charge.

¹ <https://hero.epa.gov/hero/>

- 1.5.13 Any questions about the templates or bugs encountered in web-based systematic literature review software forms during the review should be forwarded immediately to the EPA TO COR for resolution.

Definitions for this Task

1.5.14 **Reviewer Calibration Exercises**

- The contractor shall conduct a reviewer calibration exercise (establish reviewer proficiency and systematic review reproducibility) for all senior level technical experts. If a senior level technical expert has been trained previously by EPA for a step using a web-based form of a systematic review, then this step may not be needed again. Typically, a calibration exercise need only be completed once for each step of a test guideline. Final decision on this will be made by the TO COR.
- At least two (2) contractor-selected technical experts and at least one (1) EPA technical expert shall independently review the same set of titles/abstracts, articles, and/or DERs using the web-based systematic literature review software, along relevant steps for the systematic review.
- EPA will compare the contractor and EPA reviews to determine whether reviewer conflicts exist. Any conflicts shall be resolved by the contractor and EPA so that consensus on the specific articles and general principles is reached.
- Once the calibration exercise has been completed, the contractor shall continue with the systematic review steps.

1.5.15 **Quality Assurance/Quality Control (QA/QC)**

- **Blind** - A second senior level technical expert will independently (blind) screen or extract 20% of the articles reviewed by the first reviewer, and EPA or the Contractor shall conduct an independent discrepancy analysis of the results without discrepancy resolution. If there are more than 5% non-systematic discrepancies or if there are any systematic errors, EPA will evaluate the need for additional QA/QC and order discrepancy resolution or optional quantities via technical directive.
- **Pre-filled** - A second senior level technical expert will review results of 20% of the screenings or extractions by the first reviewer, and EPA or the Contractor shall conduct an independent discrepancy analysis of the results without discrepancy resolution. If there are more than 5% non-systematic discrepancies or if there are any systematic errors, EPA will evaluate the need for additional QA/QC and order discrepancy resolution or optional quantities via technical directive.
- **Optional Quantities** - EPA may order up to 4 optional quantities (up to 100% of the articles) for blind or pre-filled QC via technical directive. Each optional quantity represents 20% of the articles reviewed by the first senior level technical expert. For each optional quantity, a second senior level technical expert will QC screen 20% of the reviewed by the first reviewer. EPA or the Contractor shall conduct an independent discrepancy analysis of the results to determine whether additional optional quantities are needed.

- **Discrepancy resolution** - Senior-level reviewers consult with each other and, as necessary, a project leader or gold standard reviewer, to identify a consensus answer or approach.
- **Gold Standard Reviewer** - A gold standard reviewer (may be either an EPA or contract expert as determined by the TO COR) to resolve discrepancies when a consensus answer or approach is not feasible under discrepancy resolution. Gold standard reviewers shall participate in reviewer calibration exercises.
- **EPA QC** - After each systematic review step, EPA will sample a subset of articles for QC by EPA experts as determined by the TO COR. Depending on the outcome of this QC, EPA may order additional review via technical directive.

1.5.16 **Abstract/Title Inventorying**

Using web-based systematic literature review software provided by EPA two or more senior level (P3 or P4) technical experts shall independently review and evaluate titles and abstracts from scientific literature searches to inventory and catalog key elements embedded in the articles relevant to the overall goals of systematic review. EPA may also ask specific questions on articles web-based systematic literature review software.

- **Reviewer Calibration Exercises**– Calibration on 25-50 articles together with a gold standard reviewer
- **Quality Assurance/Quality Control (QA/QC)**
 - The Project Leader shall implement blind QC with optional quantities and a gold standard reviewer at intervals determined by the TO COR via technical directive
 - EPA shall QC the results.

1.5.17 **Full-text Inventorying**

- Using web-based systematic literature review software provided by EPA one (1) senior level (P3 or P4) technical expert will perform initial full-text screening in the systematic review process. **Full-text Inventorying** includes:
 - characterization of the overall article;
 - identification and evaluation of potentially relevant experiments within an article; and
 - methodological inventorying (such as chemicals tested, duration, species, etc.).
- The same technical reviewer does not have to inventory all papers.
- **Reviewer Calibration Exercises**– Calibration on 10-15 articles together with a gold standard reviewer
- **Quality Assurance/Quality Control (QA/QC)**
 - The Project Leader shall implement blind QC with optional quantities (either blind or pre-filled as determined by the TO COR) at intervals determined by the TO COR via technical directive
 - A gold standard reviewer will be determined as necessary by the EPA TO COR

- EPA shall QC the results

1.5.18 Data extraction

Using web-based systematic literature review software provided by EPA one (1) senior level (P3 or P4) technical expert will extract relevant data from potentially relevant experiments identified in the **Full-text Inventorying** process into pre-defined extraction forms. The same technical reviewer does not have to extract data from all papers.

- **Reviewer Calibration Exercises**– Calibration on 2-3 articles together with a gold standard reviewer
- **Quality Assurance/Quality Control (QA/QC)**
 - The Project Leader shall implement blind QC with optional quantities (either blind or pre-filled as determined by the TO COR) and at intervals determined by the TO COR via technical directive.
 - A gold standard reviewer will be determined as necessary by the EPA TO COR
 - EPA shall QC the results.

1.5.19 Study Quality Evaluation

- Using web-based systematic literature review software provided by EPA one (1) senior level (P3 or P4) technical expert will evaluate the study reporting & methodological quality and relevance of experiments extracted from studies into pre-defined forms. The same technical reviewer does not have to evaluate study quality from all papers.
- There are 3 types of Study Quality Evaluation
 - **High-level study quality evaluation (1st Tier):** Screening of overall paper quality based on high-level domain approach, adapted for type of study -> do we extract from paper? –
 - **High-level experiment quality evaluation (2nd Tier):** Screening of overall initial experiment quality based on high-level domain approach, adapted for type of study -> do we extract from experiment?
 - **Specific and full experimental quality evaluation (3rd Tier):** Specific reporting and methodological reliability for based on [SCIRAP approach](http://www.scirap.org/)² (or other EPA approved method), adapted for type of study -> what is the reliability and quality of the experiment?
- **Reviewer Calibration Exercises**– Calibration on 2-3 articles together with a gold standard reviewer.
 - **Quality Assurance/Quality Control (QA/QC)**The Project Leader shall implement blind QC with optional quantities (either blind or pre-filled as determined by the TO COR) and at intervals determined by the TO COR via technical directive
 - A gold standard reviewer will be determined as necessary by the EPA TO COR

² <http://www.scirap.org/>

- EPA shall QC the results.

1.5.20 Evidence Integration

Using web-based systematic literature review and other software provided by EPA one (1) senior level (P3 or P4) technical expert will consider the quality, consistency, relevancy, coherence and biological plausibility to analyze, synthesize and integrate the data/information. It is in this stage where the weight of the scientific evidence approach is applied to evaluate and synthesize multiple evidence streams to support the evaluation. The same technical reviewer does not have to consider all evidence streams.

- **Reviewer Calibration Exercises**– Calibration on 2-3 articles together with a gold standard reviewer.
 - **Quality Assurance/Quality Control (QA/QC)** The Project Leader shall implement blind QC with optional quantities (either blind or pre-filled as determined by the TO COR) and at intervals determined by the TO COR via technical directive
 - A gold standard reviewer will be determined as necessary by the EPA TO COR
 - EPA shall QC the results

1.5.21 Evidence Mapping

- **Evidence Mapping** consists of **Reviewer Calibration Exercises, Abstract/Title Inventorying, Full-text Inventorying, Study Quality Evaluation** (High-Level Study Quality Evaluation only), **Reviewer Calibration Exercises**
- **Quality Assurance/Quality Control (QA/QC)** steps shall also be followed.
- **Evidence Mapping** supports the goals of Identifying molecular mechanisms of xenobiotic disruption of thyroid hormone-related networks and Identifying new potential high and low throughput test methods for further development

1.5.22 Complete Extraction

- **Complete Extraction** consists of **Reviewer Calibration Exercises, Experimental Inventorying, High-level experiment quality evaluation, Data Extraction** (for relevant experiments), **Specific and full experimental quality evaluation and Evidence Integration.**
- QA/QC steps shall also be followed.
- **Complete Extraction** supports the goals of Identify reference chemicals with a range of potencies for model and test guideline development; and Identify new test methods for further development.

Specific Provisions of the Task

1.5.23 Subtask 3.1: Thyroid Systematic Review to Support Performance-Based Approaches and Pathway Interrogation

- The purpose of this subtask to support the development of high throughput screening strategies to interrogate thyroid perturbations by:

- Identifying molecular mechanisms of xenobiotic disruption of thyroid hormone-related networks;
- Identifying new potential high and low throughput test methods for further development and evaluation of molecular initiating events of adverse outcome pathways; and
- Identifying diverse reference chemicals with a range of potencies.
- In accomplishing these goals relevant to the thyroid, EPA expects to develop approaches to and ultimately accomplish:
 - Rapidly mapping and evaluating mechanistic evidence in the literature;
 - Identification of molecular initiating and key events (MIEs & KEs, respectively) using machine learning (ML) and natural language processing (NLP) approaches;
 - Evaluation of evidence outlining adverse outcome pathways (AOPs);
 - Building and linking ontologies, controlled vocabularies, and data formats across multiple databases and data formats; and
 - Rapidly and systematically evaluate study quality of relevant articles.
- The contractor will take note of Chapter 4 of the 2017 FIFRA SAP Whitepaper (U.S. EPA, 2017) including references cited within and Friedman et al. (2016). Additionally, the contractor is encouraged to review the Poster #22, “A case study approach to systematically identify and organize mechanistic information informing thyroid hormone adverse outcome pathways.” Available from: <http://dels.nas.edu/dels/resources/static-assets/best/miscellaneous/mechanistic-posters.pdf>
- For each molecular initiating event under consideration, the contractor shall provide at least two (2) senior level technical experts (e.g., P3 or P4) with experience in thyroid toxicology, especially in vitro and mechanistic assays, including, but not limited to the [Amphibian Metamorphosis \(Frog\) \(OCSP 890.1100\)](#), [Female Pubertal \(Rat\) \(OCSP 890.1450\)](#), [Male Pubertal \(Rat\) \(OCSP 890.1500\)](#), [thyroid comparative assays](#), and [molecular initiating events and key events relationships of thyroid relevant adverse outcome pathways](#)
- The reviewers shall also conduct **Data extraction, Study Quality Evaluation** as defined for this Task on articles and data evaluation records identified by EPA.
- Templates and workflows for this subtask shall be developed by EPA or under Subtask 3.5 Building Pathway Systematic Review Screening, Extraction, Evaluation, and Evidence Integration Templates and Workflows. (Paragraph 2.5.4) in the web-based systematic review literature review software identified by EPA.
- QA/QC shall be blind, with optional quantities up to 100%. The Contractor shall optionally identify a gold standard reviewer as part of the project team.

- EPA has identified 250,000 – 1,200,000 articles potentially relevant to the thyroid pathway systematic review via literature searching approaches. Many of these articles will be deemed of low priority to review via ontological/natural language processing/machine learning approaches through analysis under Subtask 3.3: Semantic Ontology Concept Mapping to Support Systematic Reviews and Subtask 3.4 Development, Analysis, and Integration of Tools, Models, and Data to Support Systematic Reviews and Text Mining. EPA and the Contractor will update and prioritize the literature space on an ongoing basis.
- In response to the RFO, the contractor will base the labor hour quote for the thyroid pathway-based systematic review on the following assumptions:
 - **Assume at least two (2) senior level technical experts** (e.g., P3 or P4 equivalent) with experience in thyroid toxicology, especially in vitro and mechanistic assays, including, but not limited to the [Amphibian Metamorphosis \(Frog\) \(OCSPP 890.1100\)](#), [Female Pubertal \(Rat\) \(OCSPP 890.1450\)](#), [Male Pubertal \(Rat\) \(OCSPP 890.1500\)](#), [thyroid comparative assays](#), and [molecular initiating events and key events relationships of thyroid relevant adverse outcome pathways](#). The contractor may identify additional senior level technical experts to complete the project within the period of performance.
 - Table 1. Estimated counts and timeframes Subtask 3.1: Thyroid Systematic Review to Support Performance-Based Approaches and Pathway Interrogation

Systematic Review Level	Level in Paper	Step	Minutes/Count	Counts
Evidence Mapping	Title/Abstract	Basic Inventory	2	15000
Evidence Mapping	Title/Abstract	MIE Inventory	1	10500
Evidence Mapping	Full Text	Basic Inventory	10	3750
Evidence Mapping	Full Text	Screening Quality	5	3750
Evidence Mapping	Full Text	MIE Inventory	10	2250
Complete Extraction	Experiment (assume 1500 papers * 3 experiments/paper)	Inventory	10	4500
Complete Extraction	Experiment	Screening Quality	10	4500
Complete Extraction	Experiment	Extraction	30	1500
Complete Extraction	Experiment	Final Experiment Quality	30	1500

- Assume that EPA will order a base quantity of 15,000 articles for **Evidence Mapping** with optional quantities in increments of 5000 articles. For **Complete Extraction** assume that the base quantity shall be 1500 articles with optional quantities in increments of 500 papers (for pricing purposes, EPA assumes 3 extractable experiments/paper). Both **Evidence Mapping** and **Complete Extraction** projects will be initiated via technical directive and target the following thyroid-relevant molecular initiating events:
- Table 2. Molecular Initiating Events (MIEs) base and optional targets for Subtask 3.1: Thyroid Systematic Review to Support Performance-Based Approaches and Pathway Interrogation. Each MIE is estimated to involve 1000-5000 studies for manual **Evidence Mapping**.

MIE	Base/Optional	Evidence Mapping	Complete Extraction
Sodium-Iodide Symporter (NIS)	Base	Being completed via a different contract mechanism	X
Thyroperoxidase (TPO)	Base	X	X
Pendrin	Optional	X	X
Dual Oxidase (DUOX)	Optional	X	X
Iodotyrosine Deiodinase (IYD)	Optional	X	X
Serum TH-Binding Proteins (distribution proteins)	Base	X	X
Membrane Transporters	Base	X	X
Iodothyronine Deiodinase (DIO)	Base	X	X
Hepatic Nuclear Receptors (NRs)	Optional	X	X
Sulfation and Glucuronidation	Optional	X	X
Alanine Side-Chain	Optional	X	X
TRH Receptor	Optional	X	X
TSH Receptor	Optional	X	X
TH Receptor	Optional	X	X
TH Transcription	Optional	X	X

EPA expects to conduct both **Evidence Mapping** and **Complete Extraction** in a modular fashion. They may be done serially or in parallel across multiple MIEs, as reviewer time allows, and EPA requirements evolve. The Literature Space for each MIE may be different, but it is expected to target a complete conceptual map. At the same time, the work may be iterative, as new ontologies and approaches are discovered to be embedded in the literature map that were not initially apparent. It may be necessary to identify new and/or different senior level technical experts for different MIE targets under **Complete Extraction**, but EPA does not anticipate MIE-specific expertise for **Evidence Mapping**.

1.5.24 OPTIONAL Subtask 3.2: Steroidogenesis Systematic Review to Support Performance-Based Approaches and Pathway Interrogation

- The purpose of this subtask to support the development of high throughput screening strategies to interrogate steroidogenesis perturbations by:
 - Identifying molecular mechanisms of xenobiotic disruption of steroidogenesis hormone-related networks;
 - Identifying new potential high and low throughput test methods for further development and evaluation of molecular initiating events of adverse outcome pathways; and
 - Identifying diverse reference chemicals with a range of potencies.
- In accomplishing these goals relevant to the steroidogenesis, EPA expects to develop approaches to and ultimately accomplish:
 - Rapidly mapping and evaluating mechanistic evidence in the literature;
 - Identification of molecular initiating and key events (MIEs & KEs, respectively) using machine learning (ML) and natural language processing (NLP) approaches;
 - Evaluation of evidence outlining adverse outcome pathways (AOPs);
 - Building and linking ontologies, controlled vocabularies, and data formats across multiple databases and data formats; and
 - Rapidly and systematically evaluate study quality of relevant articles.
- The contractor will take note of Chapter 3 of the 2017 FIFRA SAP Whitepaper (U.S. EPA, 2017) including references cited within and {pinto, 2017}.
- For each target search, the contractor shall provide at least two (2) senior level technical experts (e.g., P3 or P4) with experience in steroidogenesis, especially in vitro and mechanistic assays, including, but not limited to the [890.1550 – Steroidogenesis \(Human Cell Line – H295R\)](#), [890.1200 – Aromatase \(Human Recombinant\)](#).
- The reviewers shall also conduct **Data extraction, Study Quality Evaluation** as defined for this Task on articles and data evaluation records identified by EPA.
- Templates and workflows for this subtask shall be developed by EPA or under Subtask 3.5 Building Pathway Systematic Review Screening, Extraction, Evaluation, and Evidence Integration Templates and Workflows. (Paragraph 2.5.4) in the web-based systematic review literature review software identified by EPA.
- QA/QC shall be blind, with optional quantities up to 100%. The Contractor shall optionally identify a gold standard reviewer as part of the project team.
- EPA has identified approximately 30,000 articles potentially relevant to the steroidogenesis pathway systematic review via literature searching approaches. Many of these articles will be deemed of low priority to review via ontological/natural language processing/machine learning approaches through analysis under Subtask 3.3: Semantic Ontology Concept Mapping to Support Systematic Reviews and Subtask 3.4 Development, Analysis, and Integration of Tools, Models, and Data to Support Systematic Reviews and Text Mining. EPA and the Contractor will update and prioritize the literature space on an ongoing basis.

- In response to the RFO, the contractor should base the labor hour quote for the thyroid pathway-based systematic review on the following assumptions:
 - **Assume at least two (2) senior level technical experts** (e.g., P3 or P4 equivalent) for each target search, the contractor shall provide at least two (2) senior level technical experts (e.g., P3 or P4) with experience in steroidogenesis, especially in vitro and mechanistic assays, including, but not limited to the [890.1550 – Steroidogenesis \(Human Cell Line – H295R\)](#), [890.1200 – Aromatase \(Human Recombinant\)](#).
 - The contractor may identify additional senior level technical experts to complete the project within the period of performance.
 - Table 3. Estimated counts and times for each step Subtask 3.2: Steroidogenesis Systematic Review to Support Performance-Based Approaches and Pathway Interrogation

Systematic Review Level	Level in Paper	Step	Minutes/Count	Counts
Evidence Mapping	Title/Abstract	Basic Inventory	2	15000
Evidence Mapping	Title/Abstract	Target Inventory	1	10500
Evidence Mapping	Full Text	Basic Inventory	10	3750
Evidence Mapping	Full Text	Screening Quality	5	3750
Evidence Mapping	Full Text	Target Inventory	10	2250
Complete Extraction	Experiment (assume 1500 papers * 3 experiments/paper)	Inventory	10	4500
Complete Extraction	Experiment	Screening Quality	10	4500
Complete Extraction	Experiment	Extraction	30	1500
Complete Extraction	Experiment	Final Experiment Quality	30	1500

- Assume that EPA will order optional quantities in increments of 5000 articles for **Evidence Mapping**. For **Complete Extraction** assume that EPA will order optional quantities in increments of 500 papers (for pricing purposes, EPA assumes 3 extractable experiments/paper). Both **Evidence Mapping** and **Complete Extraction** projects will be initiated via technical directive and target the following steroidogenesis scopes:

- Table 4. Targets for Subtask 3.2: Steroidogenesis Systematic Review to Support Performance-Based Approaches and Pathway Interrogation. Each target is estimated to involve 1000-5000 studies for manual **Evidence Mapping**.

Species	Tissues/models	Pathway portion(s)	Measurements	Base/Optional	Evidence Mapping	Complete Extraction
Humans	H295r cells	Estrogens & Androgens	Hormone levels	Optional	X	X
Mammalian	Other gonadal models	Estrogens & Androgens	Hormone levels	Optional	X	X
Mammals and non-mammalian	Other gonadal models and non-gonadal models	Estrogens & Androgens	Hormone levels	Optional	X	X
Mammalian	H295r & other gonadal models and non-gonadal models	Androgens & Estrogens & Progestogens	Enzyme activity	Optional	X	X
Mammalian	H295r & other gonadal models and non-gonadal models	Androgens & Estrogens & Progestogens	Gene expression	Optional	X	X
Mammalian	H295r & other gonadal models and non-gonadal models	Progestogens	Hormone levels	Optional	X	X
Mammalian	H295r & other gonadal models and non-gonadal models	Progestogens	Enzyme activity	Optional	X	X
Other species (fish, amphibians etc.)	H295r & other gonadal models and non-gonadal models	Androgens & Estrogens & Progestogens	Hormone levels & enzyme activities	Optional	X	X

EPA expects to conduct both **Evidence Mapping** and **Complete Extraction** in a modular fashion. They may be done serially or in parallel across multiple targets, as reviewer time allows, and EPA requirements evolve. The Literature Space for each target may be different, but it is expected to target a complete conceptual map. At the same time, the work may be iterative, as new ontologies and approaches are discovered to be embedded in the literature map that were not initially apparent. It may be necessary to identify new and/or different senior level technical experts for different targets under **Complete Extraction**, but EPA does not anticipate targets-specific expertise for **Evidence Mapping**.

1.5.25 Subtask 3.3: Semantic Ontology Concept Mapping to Support Systematic Reviews

- The purpose of this technical directive is to describe work for semantic ontology concept mapping of terms encountered throughout the systematic review process including:
 - author reported terms extracted during systematic review;
 - annotated terms from free text; and
 - search terms and database mappings;
- Although the application of systematic review methodology promotes a clear and consistent interpretation of the best available evidence, it has also introduced a semantic challenge. Language semantics are critical during the evaluation and synthesis modules of the risk assessment workflow. However, terms across the scientific literature space are often non-standard, redundant, and mischaracterized. One approach to address this issue is to standardize extracted data (i.e. remove acronyms, single versus plural, etc.), match to existing vocabularies, and map consistent vocabularies to ontology concepts. Semantic ontology concept mapping can be used as a point of integration and promote consistent interpretation as well as interoperability with other relevant databases. Semantic ontology concept mapping will also provide opportunities to deploy machine learning, natural language processing, and automation to increase data extraction efficiency and enable data-driven identification of potential pathways impacted by chemical exposures.
- Term standardization and semantic ontology concept mapping can be addressed through a variety of approaches each of which may entail an initial preprocessing of data (i.e. remove acronyms, single versus plural, parenthetical data, etc.) and vocabulary matching. There are several resources available for automating semantic ontology concept mapping (Table 2) {Jovanovic, 2017, 5187528}, but a manual review may still be needed to ensure vocabularies and ontology mappings are relevant (both correct ontology class, but also from a relevant, well-maintained ontology). The approaches to term standardization may include but are not limited to:
 - Map prepared terms to ontology classes (a.k.a. concepts) using various resources such as those indicated in Table 1

- Use a string comparison or other method to compare terms and use a similarity score (0-1 where 1 is the highest match)
 - Manual curation of matched class and ontology results up to the top 5 ontologies
 - The Contractor shall:
 - Develop an approach to preprocess terms as described above;
 - Develop an approach to match terms to ontology classes and ontologies. Note: that we have access to a Java-based Bioportal Ontology Tool that uses the REST web service API within the BioPortal Ontology Browser that allows batch term processing, making use of BioPortal's Annotator and Recommender features. Battelle may identify and recommend other tools (such as OntoCat) or approaches.
 - Develop a method to manually review mapped terms for appropriate context, including, but not limited to:
- 1.5.25...1 Context from extracted study data (included in the term file delivered by EPA);
- 1.5.25...2 Textual definition;
- 1.5.25...3 Synonyms, preferred name;
- 1.5.25...4 Parent class;
- 1.5.25...5 Knowledge of ontology; and
- 1.5.25...6 Additional analyses as appropriate.
- Develop a method to score preliminary mapping results for applicability that can be used in Section 3.c. above.
 - Deliver computable files (such as JSON, CSV, etc.) that includes: URI, search parameters (original source term), matched class, matched ontology, preferred name, synonyms, definition, Ontology ID, etc.
 - Develop a method to match terms between terminology files (e.g. Excel's MATCH function, Open Information Integration (Open II) Harmony tool or linked semantic ontology concept mappings)
 - All materials relevant to accomplishing this technical directive shall be delivered to the Contractor as confidential materials. EPA expects to deliver the following materials:
 - The Open Information Integration tool (and potentially source code) for accessing the BioPortal Ontology Browser programmatically
 - Sets of extracted terms together with associated problem formulation statements and sources
 - This will be piloted with up to 500 terms from a single systematic review from the EPA IRIS program, but ultimately, EPA expects to analyze approximately 10,000 terms across many systematic reviews.
 - Sets of search terms from the Literature Maps supporting Subtask 3.1: Thyroid Systematic Review to Support Performance-Based Approaches and Pathway Interrogation and Subtask 3.2: Steroidogenesis Systematic Review to Support Performance-Based Approaches and Pathway Interrogation with associated problem formulation statements and sources.

- Sets of free text (Titles/Abstracts) together with associated problem formulation statements and sources associated with ongoing or completed systematic literature reviews including, but not limited to Subtask 3.1: Thyroid Systematic Review to Support Performance-Based Approaches and Pathway Interrogation, Subtask 3.2: Steroidogenesis Systematic Review to Support Performance-Based Approaches and Pathway Interrogation, Fish Short-Term Reproduction Assay, Amphibian Metamorphosis Assay, Uterotrophic, Hershberger, and Male and Female Pubertal Assays.
 - Sets of EDSP endpoint terms associated with ongoing or completed systematic literature reviews including, but not limited to Subtask 3.1: Thyroid Systematic Review to Support Performance-Based Approaches and Pathway Interrogation, Subtask 3.2: Steroidogenesis Systematic Review to Support Performance-Based Approaches and Pathway Interrogation, Fish Short-Term Reproduction Assay, Amphibian Metamorphosis Assay, Uterotrophic, Hershberger, and Male and Female Pubertal Assays.
 - Deliverables - The Contractor shall provide to the EPA the final deliverables of this investigation initiated by technical directive no later than 3 months of the kick-off meeting (except the draft project plan which is due within 10 days). These results will include the following:
 - All semantic ontology concept mapping results in a computable format (CSV, JSON, Excel, etc.) that contains relevant identifiers linking the source terminology, ontology class, and tool/method used;
 - Any code, interfaces, or other related products developed and used for the analysis;
- 1.5.25...1 A tool to support the manual curation (QC) of automated annotations (base); and
- 1.5.25...2 A tool to visualize the results linking substances (as applicable), molecular initiating and key events, key event relationships, and underlying text/studies (optional).
- Open source code (i.e. GitHub), documentation, and rationale for the methodology;
- 1.5.25...1 Report for each method and tools used and project undertaken:
- 1.5.25...2 1 pilot study with 500 endpoint terms from an EPA IRIS Program Systematic Review with 100% manual QA/QC (base).
- 1.5.25...3 1 study and tool to extend the literature map with 500 MeSH-based literature search terms from Subtask 3.1: Thyroid Systematic Review to Support Performance-Based Approaches and Pathway Interrogation with 100% manual QA/QC (base).
- 1.5.25...4 Sets of ontological mappings associated with adverse outcome pathways (AOPs), molecular initiating events, key events, key event relationships, such as those available on the AOPwiki³ {Ives, 2017} with 10% manual QA/QC (optional).
- 1.5.25...5 1 study with approximately 10,000 endpoint terms across all EPA IRIS Programs with 10% manual QA/QC and optional quantities up to 25% QA/QC (optional).
- 1.5.25...6 1 study covering all titles and abstracts in EDSP relevant in vitro and in vivo studies to be updated iteratively. Number of terms are to be determined (optional).

³ <https://www.aopwiki.org>

- 1.5.25...7 1 study tool with 500-1000 endpoint terms covering EDSP relevant in vitro and in vivo studies to be updated iteratively with 10% QA/QC and optional quantities up to 50% QA/QC (optional).
- 1.5.25...8 Additional studies ordered by technical directive (optional).
- Assume a base quantity of 1000 terms for ontological concept mapping with 100% manual QC, with optional quantities ordered in increments of 1000 terms. Assume a base quantity need to develop and document the two (2) tools described above as part of the analysis.
 - Each study shall:
- 1.5.25...1 include not only the terms that were mapped to an existing ontology,
- 1.5.25...2 but, to the extent feasible, prioritize terms that should be mapped, but did not match an existing ontology.
- Additionally, the Contractor shall propose an approach to probabilistically semantically link terms that have not been mapped, but which may simplify the process of automating ontology development. With EPA's approval the Contractor shall implement the additional approach.
- Staffing for the duration of the subtask and for each project initiated by technical directive under this subtask, the contractor shall provide at least:
 - One informatics expert with a background in programming in Python, R, or other scripting language and graph database management (such as Neo4j or OrientDB).
 - One scientific technical expert whose technical background is reviewed and approved by EPA (P3 or P4) with a background in ontologies, text mining, machine learning, and natural language processing.
 - One scientific technical expert whose technical background is reviewed and approved by EPA (P2 or P3) whose expertise is relevant to the purposes of the intended systematic review ontology (such as mammalian, eco-toxicology, thyroid, in vitro toxicology, etc.).
 - The Contractor shall provide additional expertise as needed in the following areas:
 - Expertise in scientific visualization and graphical display; and
 - Expertise in statistical analysis
 - Table 5. Potential Ontology Resources

Source	Website
National Center for Biomedical Ontology; Bioportal	https://bioportal.bioontology.org
Open Biomedical and Bioontology Foundry	http://www.obofoundry.org/
Biocreative	http://www.biocreative.org/
Universal Medical Language Syntax	https://www.nlm.nih.gov/research/umls/
MetaMap	https://metamap.nlm.nih.gov/
Ontobee	http://www.ontobee.org/
Bioassay Express	https://www.bioassayexpress.com/docs/
Others, please see https://jbiomedsem.biomedcentral.com/articles/10.1186/s13326-017-0153-x	

1.5.26 Subtask 3.4 Development, Analysis, and Integration of Tools, Models, and Data to Support Systematic Reviews and Text Mining

- Assist EPA with developing, implementing, and analyzing approaches for pathway-based systematic literature reviews such as the steroidogenesis and thyroid-related pathways and molecular-initiating events (MIEs). Tasks include statistical analysis and visualization of systematic review data, natural language processing and machine-learning analysis of literature searches, article tagging, title/abstract screening, full-text screening, data extraction, and other annotations as directed by EPA.
- The Contractor shall:
 - Identify, and, if necessary construct, approaches and tools to search and map scientific literature for systematic reviews and corpuses that EPA identifies via unsupervised, semi-supervised, supervised (and other machine learning) techniques.
 - Develop tools, workflows, and work products implementing multi-label text classifiers via natural language processing/machine learning approaches and inclusion/exclusion classifiers for titles/abstracts and full-texts for systematic reviews and corpuses that EPA identifies.
 - Develop and implement machine learning/natural language processing models based on annotation data for domains of interest (including in vitro and in vivo data across diverse assay types).
 - Analyze text models and correlation analysis between title/abstracts and full-texts in order to ascertain the probability of hidden textual features of interest.
 - Meta-analysis, meta-regression, and aggregate analysis of EDSP pathway-based systematic review and collected data on endpoints of interest.
 - Graphical representation and statistical analysis of EDSP data to support the development of validated high throughput approaches that reduce the use of animal toxicity testing (optional).
- Workflow management approaches and tools to address multiple hierarchies of data extraction approaches such as:
 - Automated pre-building of integrated **Complete Extraction** hierarchical workflows in the web-based systematic review software based on multi-labeled classification of textual models. This workflow should be coordinated with the menu of hierarchical data extraction templates under Subtask 3.5 Building Pathway Systematic Review Screening, Extraction, Evaluation, and Evidence Integration Templates and Workflows.
 - Encoding and automation of “living” systematic reviews (building on the map above).
- For each analysis and tool initiated by technical directive under this subtask, the contractor shall provide at least:
 - One informatics expert with a background in programming in Python or R (or other scripting language) and relational database management (such as MySQL or PostgreSQL).

- One scientific technical expert whose technical background is reviewed and approved by EPA (P3 or P4) with a background in text mining, machine learning, and natural language processing.
- One scientific technical expert whose technical background is reviewed and approved by EPA (P2 or P3) whose expertise is relevant to the purposes of the intended systematic review project (such as mammalian or eco-toxicology).
- EPA assumes that for each optional quantity ordered after the base work is developed (except Meta-analysis, meta-regression, and aggregate analysis of EDSP pathway-based systematic review and collected data on endpoints of interest and Graphical representation and statistical analysis of EDSP data to support the development of validated high throughput approaches that reduce the use of animal toxicity testing (optional).), staff identified above shall need to work 25% of time for a 2-month period.
- EPA assumes that for each optional quantity ordered of Meta-analysis, meta-regression, and aggregate analysis of EDSP pathway-based systematic review and collected data on endpoints of interest and Graphical representation and statistical analysis of EDSP data to support the development of validated high throughput approaches that reduce the use of animal toxicity testing (optional) statistical and computational staff shall need to collaborate over a 6-month period.
- The Contractor may also provide additional expertise as needed including in the following areas:
 - Expertise in scientific visualization and graphical display; and
 - Expertise in statistical analysis
- Table 6. Deliverables for Subtask 3.4 Development, Analysis, and Integration of Tools, Models, and Data to Support Systematic Reviews and Text Mining

General product	Expected outputs	Subtask 3.1: Thyroid Systematic Review to Support Performance-Based Approaches and Pathway Interrogation	Subtask 3.2: Steroidogenesis Systematic Review to Support Performance-Based Approaches and Pathway Interrogation
Identify, and, if necessary construct, approaches and tools to search and map scientific literature for systematic reviews and corpuses that EPA identifies via unsupervised, semi-supervised, supervised (and other machine learning) techniques. Encoding and automation of “living” systematic reviews.	<ul style="list-style-type: none"> • Workplan • Updated literature map for each MIE with priorities • Integrated tool between web-based SR software, literature databases, HERO reference manager, and 	<ul style="list-style-type: none"> • Base: See base MIEs in Table 1 • Optional: See optional MIEs in Table 1 	Optional

	<ul style="list-style-type: none"> offline analytics for updating on-the-fly Report, code, & documentation 		
Develop tools, workflows, and work products implementing multi-label text classifiers via natural language processing/machine learning approaches and inclusion/exclusion classifiers for titles/abstracts and full-texts for systematic reviews and corpuses that EPA identifies	<ul style="list-style-type: none"> Workplan Integrated tool between web-based SR software data exports, literature databases, and offline analytics for updating on-the-fly Updated literature map for each MIE with priorities Report, code, & documentation 	<ul style="list-style-type: none"> Base: See base MIEs in Table 1 Optional: See optional MIEs in Table 1 	Optional
Develop and implement machine learning/natural language processing models based on annotation data for domains of interest (including in vitro and in vivo data across diverse assay types).	<ul style="list-style-type: none"> Workplan Report, code, & documentation Models Data 	Base for NIS as pilot Optional for all other MIEs in Table 1	Optional
Analyze text models and correlation analysis between title/abstract and full-text inventories (Evidence Mapping) in order to ascertain the probability of hidden textual features of interest.	<ul style="list-style-type: none"> Workplan Report, code, & documentation Models 	<ul style="list-style-type: none"> Base: See base MIEs in Table 1 Optional: See optional MIEs in Table 1 	Optional
Meta-analysis, meta-regression, and aggregate analysis of EDSP pathway-based systematic review and collected data on endpoints of interest.	<ul style="list-style-type: none"> Workplan Report, code, & documentation Data 	Optional for all MIEs in Table 1	Optional

Graphical representation and statistical analysis of EDSP data to support the development of validated high throughput approaches that reduce the use of animal toxicity testing (optional).	<ul style="list-style-type: none"> • Workplan • Report, code, & documentation • Visualizations 	Optional for all MIEs in Table 1	Optional
Automated building of integrated data templates based on multi-labeled classification of textual models.	<ul style="list-style-type: none"> • Workplan • Report, code, & documentation • Templates 	Base for NIS as pilot Optional for all other MIEs in Table 1	Optional

1.5.27 Subtask 3.5 Building Pathway Systematic Review Screening, Extraction, Evaluation, and Evidence Integration Templates and Workflows.

Purpose of this subtask

- support the development and implementation of pathway systematic review title/abstract screening, full-text screening, data extraction, study quality evaluation, and evidence integration templates; and
- support the development of pathway reviewer workflows (including QA/QC and calibration) in systematic review tools selected by EPA.

The contractor shall:

- Build systematic review templates in the web-based systematic literature review software chosen by EPA to meet the needs of the QA/QC, calibration, screening, extraction, evaluation, and integration needs of the EPA and Contractor scientific and project management staff associated with an EPA pathway systematic review project;
- Align the templates with external data formats and controlled vocabularies such as (but not limited to):
 - IUCLID (see for example, https://iuclid6.echa.europa.eu/documents/21812392/22307013/IUCLID+6_2.0.0_for_mat.zip/dca3ad2d-796c-2faa-ee0d-d58ef1deb376)
 - OECD Harmonized Templates (<http://www.oecd.org/ehs/templates/>, including, but not limited to: OHT 48-2 & 75-3)
 - [Unified Medical Language System \(UMLS\)](#)
 - [AOPWiki](#)
 - [Medical Subject Headings](#) (MeSH)
 - Ontologies and vocabularies identified and/or developed in Subtask 3.3: Semantic Ontology Concept Mapping to Support Systematic Reviews
- Implement the templates in the web-based systematic literature review software chosen by EPA to facilitate the review by scientific staff associated with a Systematic Review Project under this Task; and

- Extract and transform the data from the web-based systematic literature review software chosen by EPA into usable format for further statistical analysis, visualization, and/or storage in a chemical risk assessment/hazard repository such as (but not limited to) [IUCLID](#), [HAWC](#), or [ToxRefDB](#).

For each Systematic Review Templates and Workflows Project initiated by technical directive under this subtask, the contractor shall provide at least:

- One informatics expert with a background in programming in Python or other scripting language and relational database management (such as MySQL or PostgreSQL).
- One scientific technical expert whose technical background is reviewed and approved by EPA (P2 or P3) whose expertise is relevant to the purposes of the intended systematic review project (such as mammalian or eco-toxicology). This expert shall work with EPA staff and the contractor informatics expert to:
 - translate EPA guidelines, standard evaluation procedures, data evaluation records, scientific literature, and scientific reviewer feedback into meaningful templates and workflows; and
 - map the proposed systematic review template to external formats and controlled vocabularies or ontologies.
- The work and approaches of both the informatics and the scientific technical expert shall be reviewed by either a higher-tier expert of comparable expertise of the contractor or by EPA.
- Deliverables
 - Templates and workflows in and outside of the web-based systematic literature review software chosen by EPA to support Subtask 3.1: Thyroid Systematic Review to Support Performance-Based Approaches and Pathway Interrogation, base and optional deliverables as indicated in Table 1
 - Templates and workflows in and outside of the web-based systematic literature review software chosen by EPA to support Subtask 3.2: Steroidogenesis Systematic Review to Support Performance-Based Approaches and Pathway Interrogation (Optional)

1.6 TASK 4. CLUSTERING, PRIORITIZING, AND EVALUATING OF THE EDSP UNIVERSE OF CHEMICALS

- 1.6.1 Support the clustering, prioritization, and evaluation of chemical substances of the EDSP Universe of Chemicals⁴ including analysis of chemical structure, data on physical-chemical properties, use and exposures, and toxicology. The EDSP Universe of Chemicals is a critical component driving EDSP pathway-based systematic reviews and implementation of the EDSP Pivot (80 FR 35350).

⁴ <https://www.epa.gov/endocrine-disruption/endocrine-disruptor-screening-program-edsp-universe-chemicals>

- 1.6.2 *Subtask 4.1* Evaluate chemical domain of applicability of existing and new high and low throughput results from sources such as EPA systematic literature reviews, ToxCast, and Tox21 against the EDSP Universe of Chemicals. *Base and optional quantities.*
- Deliverable 1: Proposal to evaluate overlap of substances and clusters (considering chemical structure, physical-chemical properties, in vivo and in vitro data) between updated EDSP Universe of Chemicals, Tox21, and ToxCast. Contractor shall deliver to EPA within 1 month of subtask initiation.
 - Deliverable 2: Pending acceptance of Deliverable 1 under this Subtask by EPA, Contractor shall implement the proposed evaluation. Contractor shall deliver a draft version of this work no later than 12 weeks after acceptance of Deliverable 1.
 - Deliverable 3: Following acceptance of Deliverable 2 under this Subtask by EPA, Contractor shall provide all code, scripts, data, and documentation within 1 month.
- 1.6.3 *Subtask 4.2:* Identify, integrate, and evaluate diverse metrics such as chemical exposure (e.g. EPA's ExpoCast), weight-of-evidence outcomes, degree of completion of EDSP Tier 1 battery, physical-chemical properties, potency, chemical cluster, etc. in order to prioritize the EDSP Universe of Chemicals for different purposes such as *in vivo* EDSP Tier 1 or Tier 2 testing, high throughput testing, grouping or read-across approaches. *Base and optional quantities.*
- Deliverable 1: Proposal to identify, integrate, and evaluate diverse metrics such as chemical exposure (e.g. EPA's ExpoCast), weight-of-evidence outcomes, degree of completion of EDSP Tier 1 battery, physical-chemical properties, potency, chemical cluster, etc. in order to prioritize the EDSP Universe of Chemicals for difference purposes. Contractor shall deliver to EPA within 1 month of subtask initiation.
 - Deliverable 2: Pending acceptance of Deliverable 1 under this Subtask by EPA, Contractor shall implement the proposed integration, annotation, and clustering of the inventories. Contractor shall deliver a draft version of this work no later than 6 weeks after acceptance of Deliverable 1.
 - Deliverable 3: Following acceptance of Deliverable 2 under this Subtask by EPA, Contractor shall provide all code, scripts, data, and documentation within 1 month.
- 1.6.4 *Subtask 4.3* Using robust EDSP-relevant bioactivity models (such as the ER models described in [Judson, et al. \(2015\)](#) and [Kleinstreuer, et al. \(2017\)](#).) that utilize redundant and overlapping assays, develop and characterize minimal assays sets (such as described in [Judson, et al. \(2017\)](#)) for each model including analysis of the chemical domains of applicability.
- Deliverable 1: Proposal to evaluate the ER minimal assay sets described in [Judson, et al. \(2017\)](#) by clusters as developed under paragraph 1.6.2. Contractor shall deliver to EPA within 1 month of task initiation.
 - Deliverable 2: Pending acceptance of Deliverable 1 by EPA, Contractor shall implement the proposed evaluation. Contractor shall deliver a draft version of this work no later than 8 weeks after acceptance of Deliverable 1.

- Deliverable 3: Proposal to develop the AR bioactivity model minimal assay sets for agonism and antagonism using an approach comparable to that described in [Judson, et al. \(2017\)](#) including clusters as developed under paragraph 1.6.2. Contractor shall deliver to EPA within 4 weeks after acceptance of Deliverable 2.
- Deliverable 4: Pending acceptance of Deliverable 3 by EPA, Contractor shall implement the proposed evaluation. Contractor shall deliver a draft version of this work no later than 8 weeks after acceptance of Deliverable 3.
- Deliverable 5: Following acceptance of Deliverables 2 & 4 under this Subtask by EPA, Contractor shall provide all code, scripts, data, and documentation for the respective Deliverables within 1 month.

For this Task, initiated by technical directive under this subtask, the Contractor shall provide at least:

- One scientific technical expert whose technical background is reviewed and approved by EPA (P2 or P3) with a background in cheminformatics, bioinformatics, or related field
 - Experience in managing chemical risk assessment data; standard approaches for clustering and analyzing large inventories of chemical substances by chemical structure (chemical descriptors such ToxPrints or PaDEL), bioactivity, physical-chemical properties, and other molecular descriptors.
 - Experience or capability developing in R or Python (or other open source tool) and MySQL using standard open-source or freely available cheminformatics/bioinformatics toolkits.
 - Experience creating and documenting reproducible research
 - Experience with Instant JChem (IJC) and/or QSAR ToolBox will also be helpful.
 - Significant additional chemical data and workflows are embedded in QSAR Toolbox (QTB). Previous experience utilizing QTB, including the API, of this information will significantly enhance the project.
- One informatics expert with a background in programming in Python or other scripting language and relational database management (such as MySQL or PostgreSQL).
- Two scientific technical experts whose technical background is reviewed and approved by EPA (P2 or P3) with backgrounds in endocrine in vitro and in vivo toxicology, or related field. This expert shall work with EPA staff and the contractor informatics experts to provide context for the in vivo and in vitro toxicological data.
- One scientific technical expert whose technical background is reviewed and approved by EPA (P2 or P3) with a background in chemical risk assessments and toxicological testing and their relation to physical-chemical properties. This expert shall work with EPA staff and the contractor informatics experts to provide context for the in vivo and in vitro toxicological data.
- The experts may be the same person, if the time and background is appropriate.

- The work and approaches of both the informatics and the scientific technical experts shall be reviewed by either a higher-tier expert of comparable expertise of the contractor or by EPA.
- EPA assumes each optional quantity ordered under *Subtask 4.1* Evaluate chemical domain of applicability of existing and new high and low throughput results from sources such as EPA systematic literature reviews, ToxCast, and Tox21 against the EDSP Universe of Chemicals and *Subtask 4.2*: Identify, integrate, and evaluate diverse metrics such as chemical exposure (e.g. EPA's ExpoCast), weight-of-evidence outcomes, degree of completion of EDSP Tier 1 battery, physical-chemical properties, potency, chemical cluster, etc. in order to prioritize the EDSP Universe of Chemicals for different purposes such as *in vivo* EDSP Tier 1 or Tier 2 testing, high throughput testing, grouping or read-across approaches shall take 1 month at 50% staff time after the base quantities/analyses are completed/developed.

1.7 REPORTING REQUIREMENTS AND DELIVERABLES

The contractor shall provide the following deliverables listed in Table 7.

1.7.1 Deliverables and Schedule

- Table 7. Overall Task Order Deliverables and Schedule.

Tasks	Deliverables	Due Dates
1	<p>Task management</p> <ul style="list-style-type: none"> ✓ Kick-off meeting within 2 weeks after the task order has been awarded. ✓ Monthly Progress Report (i.e. Technical/Progress Status Report and Financial Status Report) by the 15th of each month (following completion of 1st reporting period). ✓ Biweekly status meetings ✓ Other meetings as required by the TOCOR ✓ Email a copy to the CO, Contract level COR, TOCOR, and Alt TOCOR ✓ Immediately inform the TOCOR when any hours or costs for any task has exceeded or is expected to exceed the contractor estimate by >10%. ✓ Immediately inform the TOCOR of any problems that may impact the production, budget, and/or delivery of deliverables. ✓ The Contractor shall notify the TOCOR when 75% of the Government approved hours or approved LH costs have been incurred (including unbilled hours and costs). 	
2	<p>EPA Requirements for Quality Assurance Project Plans (QA/R- 5) https://www.epa.gov/quality/epa-qar-5-epa-requirements-quality-assurance-project-plans</p> <ul style="list-style-type: none"> ✓ Draft QAPP ✓ Final QAPP 	<ul style="list-style-type: none"> ✓ Draft QAPP. Within 10 business days after Task Order Award. ✓ Final QAPP. Within 5 business days of receipt of the written comments on the draft QAPP, unless otherwise instructed by the EPA TO COR.

Tasks	Deliverables	Due Dates
3	Subtask 3.1: Thyroid Systematic Review to Support Performance-Based Approaches and Pathway Interrogation	<ul style="list-style-type: none"> 15k studies to complete manual Evidence Mapping twelve months after award for base MIEs identified Table 1 Complete Extraction for NIS MIEs in Table 1 12 months after award Complete Extraction for other base MIEs in Table 1 18 months after award
	Subtask 3.2: Steroidogenesis Systematic Review to Support Performance-Based Approaches and Pathway Interrogation	Optional subtask by technical directive, anticipated to potentially begin 24-36 months after award date.
	Subtask 3.3: Semantic Ontology Concept Mapping to Support Systematic Reviews <ul style="list-style-type: none"> 1 pilot study with 500 endpoint terms from an EPA IRIS Program Systematic Review with 100% manual QA/QC (base). 1 study and tool to extend the literature map with 500 MeSH-based literature search terms from Subtask 3.1: Thyroid Systematic Review to Support Performance-Based Approaches and Pathway Interrogation with 100% manual QA/QC (base). Sets of ontological mappings associated with adverse outcome pathways (AOPs), molecular initiating events, key events, key event relationships, such as those available on the AOPwiki⁵ {Ives, 2017} with 10% manual QA/QC (optional). 1 study with approximately 10,000 endpoint terms across all EPA IRIS Programs with 10% manual QA/QC and optional quantities up to 25% QA/QC (optional). 1 study covering all titles and abstracts in EDSP relevant in vitro and in vivo studies to be updated iteratively. Number of terms are to be determined (optional). study tool with 500-1000 endpoint terms covering EDSP relevant in vitro and in vivo studies to be updated iteratively with 10% 	<ul style="list-style-type: none"> 3 months after task order award 3 months after award Optional tasks, by technical directive

⁵ <https://www.aopwiki.org>

Tasks	Deliverables	Due Dates
	<p>QA/QC and optional quantities up to 50% QA/QC (optional).</p> <ul style="list-style-type: none"> Additional studies ordered by technical directive (optional). 	
	<p>Subtask 3.4 Development, Analysis, and Integration of Tools, Models, and Data to Support Systematic Reviews and Text Mining</p> <ul style="list-style-type: none"> Identify, and, if necessary construct, approaches and tools to search and map scientific literature for systematic reviews and corpora that EPA identifies via unsupervised, semi-supervised, supervised (and other machine learning) techniques. Develop tools, workflows, and work products implementing multi-label text classifiers via natural language processing/machine learning approaches and inclusion/exclusion classifiers for titles/abstracts and full-texts for systematic reviews and corpora that EPA identifies Develop and implement machine learning/natural language processing models based on annotation data for domains of interest (including in vitro and in vivo data across diverse assay types). Analyze text models and correlation analysis between title/abstract and full-text inventories (Evidence Mapping) in order to ascertain the probability of hidden textual features of interest. Meta-analysis, meta-regression, and aggregate analysis of EDSP pathway-based systematic review and collected data on endpoints of interest. Graphical representation and statistical analysis of EDSP data to support the development of validated high throughput approaches that reduce the use of animal toxicity testing (optional). Automated pre-building of integrated Complete Extraction hierarchical workflows 	<ul style="list-style-type: none"> 4 months for NIS MIE 12 months for other base MIEs in Table 1 Optional for other optional MIEs in Table 1 4 months for NIS MIE 12 months for other base MIEs in Table 1 Optional for other optional MIEs in Table 1 6 months for NIS MIE Optional for other optional MIEs in Table 1 4 months for NIS MIE 12 months for other base MIEs in Table 1 Optional for other optional MIEs in Table 1 Optional for all MIEs in Table 1 Optional for all MIEs in Table 1

Tasks	Deliverables	Due Dates
	in the web-based systematic review software based on multi-labeled classification of textual models. This workflow should be coordinated with the menu of hierarchical data extraction templates under Subtask 3.5 Building Pathway Systematic Review Screening, Extraction, Evaluation, and Evidence Integration Templates and Workflows.	<ul style="list-style-type: none"> • 5 months for NIS MIE Complete Extraction • Optional for other optional MIEs in Table 1
	Subtask 3.5 Building Pathway Systematic Review Screening, Extraction, Evaluation, and Evidence Integration Templates and Workflows.	<ul style="list-style-type: none"> • 3 months for NIS MIE Complete Extraction • 6 months for other base MIEs in Table 1 • Optional for other optional MIEs in Table 1
4	Task 4. Clustering, prioritizing, and evaluating of the EDSP Universe of Chemicals	See interim deliverable timelines under each Subtask
	<i>Subtask 4.1</i> Evaluate chemical domain of applicability of existing and new high and low throughput results from sources such as EPA systematic literature reviews, ToxCast, and Tox21 against the updated EDSP Universe of Chemicals.	6 months from award date for all interim and final deliverables. Optional quantities by technical directive.
	<i>Subtask 4.2:</i> Identify, integrate, and evaluate diverse metrics such as chemical exposure (e.g. EPA's ExpoCast), weight-of-evidence outcomes, degree of completion of EDSP Tier 1 battery, physical-chemical properties, potency, chemical cluster, etc. in order to prioritize the EDSP Universe of Chemicals for different purposes such as <i>in vivo</i> EDSP Tier 1 or Tier 2 testing, high throughput testing, grouping or read-across approaches.	12 months from award date for all interim and final deliverables. Optional quantities by technical directive.

Tasks	Deliverables	Due Dates
	<p><i>Subtask 4.3</i> Using robust EDSP-relevant bioactivity models (such as the ER models described in Judson, et al. (2015) and Kleinstreuer, et al. (2017).) that utilize redundant and overlapping assays, develop and characterize minimal assays sets (such as described in Judson, et al. (2017)) for each model including analysis of the chemical domains of applicability.</p>	<p>15 months after award date for all interim and final deliverables. Optional quantities by technical directive.</p>

1.8 ACCEPTABLE QUALITY LEVEL FOR TASKS

See Attachment 1: Quality Assurance Surveillance Plan

1.9 PERIOD OF PERFORMANCE

The period of performance of this task order is:

Base: 24 months from award date

Option 1: 12 months from option exercise

Option 2: 12 months from option exercise

1.10 PLACE OF PERFORMANCE

Work may be performed off-site.

1.11 PERSONNEL

The Contractor is responsible for providing personnel with the necessary level expertise to support the task activities and requirement in this PWS.

1.12 TASK ORDER TYPE: TIME & MATERIALS

1.13 GOVERNMENT FURNISHED EQUIPMENT (GFE)

In accordance with FAR 45.102, the contractor shall furnish all property required for performing Government contracts. If a contractor believes that Government property is required for performance of the contract, the contractor shall submit a written request to the CO. For cost purposes, assume that EPA shall provide government furnished computer equipment, badging, and desktop connectivity (login, e-mail) for approved personnel needing access to EPA IT resources behind the EPA firewall and/or confidential business information (CBI) to complete work under Task 4 of this task order.

1.14 TRAVEL

The Contractor may be required to travel during the performance of this task order. The Contractor is required to follow the requirements of subpart 31.2 of the FAR regulations in incurring allowable travel costs under this task order, and correspondingly must always seek and obtain government rates whenever available and observe current subsistence ceilings. Travel costs shall not exceed \$2,000 per year. Contractors are encouraged to use public transportation.

1.15 TRAINING

EPA-H-31-105 APPROVAL OF TRAINING [see Section H.22 of the IDIQ contract]

(a) The contractor shall provide and maintain a qualified staff of personnel to meet the requirements of the

Performance Work Statement. The contractor shall provide training to keep its personnel abreast of changes to the science and/or technology associated with the requirements of the contract. In addition, the contractor shall ensure that its personnel receive appropriate safety, health and environmental training in accordance with Federal, state and local requirements prior to assigning any task that require such training. The contractor shall provide documentation of such training upon the request of the Contract-Level COR and/or Contracting Officer.

The Government will not directly reimburse the cost for contractor employees to meet or maintain minimal contract requirements or to obtain and sustain an appropriate level of professionalism. Any direct charges for training will only be considered for reimbursement under this contract by compliance with the procedures set forth in paragraph (b) (see Section H.22 of the IDIQ contract).

2 INSPECTION AND ACCEPTANCE

2.1 QUALITY ASSURANCE PROJECT PLAN (SEE TASK 2 ABOVE)

The Contractor shall submit a draft QAPP per EPA Requirements for Quality Assurance Project Plans (QA/R-5) (Table 2).

Table 2. Quality Assurance Project Plan

	Documentation	Specifications	Due
X	Quality Assurance Project Plan for the Task Order	EPA Requirements for Quality Assurance Project Plans (QA/R- 5) (dated 3//20/2011) https://www.epa.gov/quality/epa-qar-5-epa-requirements-quality-assurance-project-plans	✓ Draft QAPP. Within 10 business days after Task Order Award. ✓ Final QAPP. Within 5 business days of receipt of the written comments on the draft QAPP, unless otherwise instructed by the EPA TO COR.

3 TASK ORDER ADMINISTRATION DATA

3.1 CONTRACT ADMINISTRATION REPRESENTATIVES

- Contracting Officer: Jody Gosnell, Team Leader OAS/HQAD
- Contract Specialist: Eric Ward, OAS/HQAD
- Contract Level Contracting Officer's Representative: Sharlene Matten, OSCP/EACPD
- Task Order Contracting Officer's Representative: Kristan Markey, OSCP/EACPD

3.2 TASK ORDER CLAUSES

3.3 INVOICING

Invoices shall be submitted in accordance with contract clause G.3 EPAAR 1552.232-70 SUBMISSION OF INVOICES. (JUN 1996) - ALTERNATE I (JUN 1996).

3.4 FAR 52.216-18 ORDERING. (OCT 1995)

- (a) Any supplies and services to be furnished under this contract shall be ordered by issuance of delivery orders or task orders by the individuals or activities designated in the Schedule. Such orders may be issued from **09/28/2018** through **09/27/2023**.
- (b) All delivery orders or task orders are subject to the terms and conditions of this contract. In the event of conflict between a delivery order or task order and this contract, the contract shall control.
- (c) If mailed, a delivery order or task order is considered "issued" when the Government deposits the order in the mail. Orders may be issued orally, by facsimile, or by electronic commerce methods only if authorized in the Schedule.

3.5 FAR 52.217-8 OPTION TO EXTEND SERVICES. (NOV 1999)

The Government may require continued performance of any services within the limits and at the rates specified in the contract. These rates may be adjusted only as a result of revisions to prevailing labor rates provided by the Secretary of Labor. The option provision may be exercised more than once, but the total extension of performance hereunder shall not exceed 6 months. The Contracting Officer may exercise the option by written notice to the Contractor within 30 days before the contract expires.

3.6 FAR 52.217-9 OPTION TO EXTEND THE TERM OF THE CONTRACT (MAR 2000)

- (a) The Government may extend the term of this contract by written notice to the Contractor within 30 days; provided that the Government gives the Contractor a preliminary written notice of its intent to extend at least 60 days before the contract expires. The preliminary notice does not commit the Government to an extension.

(b) If the Government exercises this option, the extended contract shall be considered to include this option clause.

(c) The total duration of this contract, including the exercise of any options under this clause, shall not exceed 5 years and 6 months.

3.7 EPA-J-52-101 LIST OF ATTACHMENTS

Attachment 1: QUALITY ASSURANCE SURVEILLANCE PLAN

4 REFERENCES

- Dang, Z; Traas, T; Vermeire, T. (2011). Evaluation of the fish short term reproduction assay for detecting endocrine disrupters. Chemosphere 85: 1592-1603.
<http://dx.doi.org/10.1016/j.chemosphere.2011.08.006>
- Friedman, KP; Watt, ED; Hornung, MW; Hedge, JM; Judson, RS; Crofton, KM; Houck, KA; Simmons, SO. (2016). Tiered High-Throughput Screening Approach to Identify Thyroperoxidase Inhibitors Within the ToxCast Phase I and II Chemical Libraries. Toxicol Sci 151: 160-180.
<http://dx.doi.org/10.1093/toxsci/kfw034>
- U.S. EPA (U.S. Environmental Protection Agency). (2017). December 2017 FIFRA SAP Meeting - Continuing Development of Alternative High-Throughput Screens to Determine Endocrine Disruption, Focusing on Androgen Receptor, Steroidogenesis, and Thyroid Pathways.
<https://www.regulations.gov/docket?D=EPA-HQ-OPP-2017-0214>

ATTACHMENT 1

QUALITY ASSURANCE SURVEILLANCE PLAN

QUALITY ASSURANCE SURVEILLANCE PLAN

PERFORMANCE REQUIREMENT	PERFORMANCE MEASURE (PM)	PERFORMANCE STANDARD	SURVEILLANCE METHOD	INCENTIVES & DISINCENTIVES
MANAGEMENT AND COMMUNICATION: The contractor shall maintain contact with the EPA CO, COR, and TOCOR throughout the performance of the contract.	Contractor shall immediately bring potential problems to the appropriate EPA personnel and shall recommend actions that would mitigate or resolve the problem.	Issues that impact project schedules and costs shall be brought to the attention of the EPA within 3-days of occurrence.	All active task orders will be reviewed by the EPA to identify unreported issues.	Performance will be considered in the award of subsequent task orders and will be factored into the evaluation of Business Relations in the Contractor Assessment Reporting System (CPARS).
TIMELINESS: For every Task Order awarded establishing a firm, specific date for the generation of a the contractor shall deliver such report to the COR, TOCOR and no later than the time specified order's PWS.	Deliverables and related work must comply with contractual timeliness requirements. The contractor will be evaluated on its responsiveness to all task orders.	95% of all deliverables and related work shall be completed on time within task schedule and/or tech. direction requirements.	100% inspection of all deliverables and related work by the TOCOR; TOCOR will document the timeliness of all work requirements.	Performance will be considered in the award of subsequent task orders and will be factored into the annual evaluation of Timeliness in the Contractor Performance Assessment Reporting System (CPARS).
TECHNICAL QUALITY: For every task order awarded, analyses conducted by the shall be factual, defensible, and based on sound scientific methods. All data shall be from reputable sources and assurance measures shall be conducted in accordance with agency requirements outlined in task orders.	All deliverables and related work must be complete, accurate, thorough, and professionally credible.	Data are 100% accurate; review demonstrates a high level of expertise and credibility with regard to personnel and use of scientific methodology. Task Orders shall be conducted in strict conformance with approved OA plans. Outputs shall withstand internal review by the US EPA and outside scientific reviewers.	EPA Staff will conduct secondary reviews of work completed by the contractor. Feedback will be provided.	Performance will be considered in the award of subsequent task orders and will be factored into the annual evaluation in the category of Quality of Product or Service in the Contractor Performance Assessment Reporting System (CPARS).

TASK ORDER CLAUSES

Period of Performance

The period of performance of this task order is 09/27/2019 – 09/26/2023

Submission of Invoices

Invoices shall be submitted in accordance with EPAAR 1552.232-70 SUBMISSION OF INVOICES. (JUN 1996) - ALTERNATE I (JUN 1996). See address below.

RTP Finance Center

US Environmental Protection Agency

RTP-Finance Center (AA216-01)

109 TW Alexander Drive

www2.epa.gov/financial/contracts

Durham NC 27711

E.2 Period of Performance

Base: 24 months from award date

Option 1: 12 months from option exercise

Option 2: 12 months from option exercise

F. TASK ORDER TYPE

Time and materials

G. INSPECTION AND ACCEPTANCE

G.1 Quality Assurance Project Plan

The contractor shall submit the following quality system documentation to the CO at the time frames identified below:

Documentation	Specifications	Due
Quality Assurance		
Project Plan for the Task		
Order	EPA Requirements for Quality Assurance Project Plans (QA/R-5) [dated03/20/11]	Task Order proposal due date

This documentation can be found on the following EPA website –

<https://www.epa.gov/quality/epa-qar-5-epa-requirements-quality-assurance-project-plans>

This documentation will be prepared in accordance with the specifications identified above or equivalent specifications defined by EPA.

The Government will review and return the quality documentation, with comments, and indicating approval or disapproval. If necessary, the contractor shall revise the documentation to address all comments and shall submit the revised documentation to the government for approval.

The contractor shall not commence work involving environmental data generation or use until the Government has approved the quality documentation.

H. TASK ORDER ADMINISTRATION DATA

H.1 Contract Administration Representatives

Contracting Officer: Jody Gosnell, Gosnell.jody@epa.gov

Contracting Officer's Representative: Sharlene Matten, matten.sharlene@epa.gov

I. INVOICING

Invoices shall be submitted in accordance with contract clause G.3 EPAAR 1552.232-70

SUBMISSION OF INVOICES. (JUN 1996) - ALTERNATE I (JUN 1996).

J. TASK ORDER CLAUSES

Local Clauses EPA-H-42-102 UTILIZATION OF FEDCONNECT FOR CONTRACT

ADMINISTRATION

EPA will utilize the FedConnect® web portal in administering this contract. The contractor must be registered in FedConnect® and have access to the FedConnect website located at <https://www.fedconnect.net/Fedconnect/>. For assistance in registering or for other FedConnect® technical questions please call the FedConnect® Help Desk at (800) 899-6665 or email at support@fedconnect.net.

FAR 52.216-19 ORDER LIMITATIONS. (OCT 1995)

(a) *Minimum order.* When the Government requires supplies or services covered by this contract in an amount of less than \$10,000.00, the Government is not obligated to purchase, nor is the Contractor obligated to furnish, those supplies or services under the contract.

(b) *Maximum order.* The Contractor is not obligated to honor-

(1) Any order for a single item in excess of \$4.5 Million;

(2) Any order for a combination of items in excess of \$4.5 Million; or

(3) A series of orders from the same ordering office within 7 days that together call for quantities exceeding the limitation in subparagraph (b)(1) or (2) above.

(c) If this is a requirements contract (*i.e.*, includes the Requirements clause at subsection 52.216-21 of the Federal Acquisition Regulation (FAR)), the Government is not required to order a part of any one requirement from the Contractor if that requirement exceeds the maximum-order limitations in paragraph (b) above.

(d) Notwithstanding paragraphs (b) and (c) above, the Contractor shall honor any order exceeding the maximum order limitations in paragraph (b), unless that order (or orders) is returned to the ordering office within 3 days after issuance, with written notice stating the Contractor's intent not to ship the item (or items) called for and the reasons. Upon receiving this notice, the Government may acquire the supplies or services from another source.

LOCAL CLAUSE - EPA-B-32-103A - LIMITATION OF GOVERNMENT'S OBLIGATION

(a) Severable services may be incrementally funded. Non-severable services shall not be incrementally funded. Contract

line items 1 through 62 are severable and may be incrementally funded. For these items, the sum of \$3,419,895.00 of the total price is presently available for payment and allotted to this contract.

(b) For items identified in paragraph (a) of this clause, the Contractor agrees to perform up to the point at which the total amount payable by the Government, including reimbursement in the event of termination of those items for the Government's convenience, approximates the total amount currently allotted for those items to the contract. The Contractor shall not continue work on those items beyond that point. Subject to the clause entitled, "Termination for Convenience of the Government," the Government will not be obligated, under any circumstances, to reimburse the Contractor in excess of the amount payable by the Government in the event of the termination of applicable contract line items for convenience including costs, profit, and estimated termination costs for those line items.

(c) Notwithstanding the dates specified in the allotment schedule in paragraph (h) of this clause, the Contractor will notify the Contracting Officer, in writing, at least 5 days prior to the date when, in the Contractor's best judgment, the work will reach the point at which the total amount payable by the Government, including any cost for termination for convenience, will approximate 85% of the total amount currently allotted to the contract for performance of the applicable items. The notification will state (1) the estimated date when that point will be reached and (2) an estimate of additional funding, if any, needed to continue performance of the applicable line items up to the next scheduled date for the allotment of funds identified in paragraph (a) of this clause, or to a substitute date as determined by the Government pursuant to paragraph (d) of this clause. If, after such notification, additional funds are not allotted by the date identified in the Contractor's notification, or by an agreed substitute date, the Contracting Officer will terminate any item(s) for which additional funds have not been allotted, pursuant to the clause entitled "Termination for Convenience of the Government."

(d) The parties contemplate that, subject to the availability of appropriations, the Government may allot additional funds for continued performance of the contract line items identified in paragraph (a) of this clause and will determine the estimated period of contract performance which will be covered by the funds. If additional funds are allotted, the Contracting Officer will notify the Contractor in writing. The Contractor shall not resume performance of the contract line items identified in paragraph (a) until the written notice is received. The provisions of paragraphs (b) through (d) of this clause will apply in like manner to the additional allotted funds and to the new estimated period of contract

performance. The contract will be modified accordingly.

(e) The Government may, at any time prior to termination, allot additional funds for the performance of the contract line items identified in paragraph (a) of this clause.

(f) The termination provisions of this clause do not limit the rights of the Government under the clause entitled "Default". The provisions of this clause are limited to the work and allotment of funds for the contract line items set forth in paragraph (a) of this clause. This clause no longer applies once the contract is fully funded.

(g) Nothing in this clause affects the right of the Government to otherwise terminate this contract pursuant to the contract clause entitled "Termination for Convenience of the Government".

(h) The parties contemplate that the Government may obligate funds to this contract in accordance with the following schedule:

RECAPITULATION:

	PRIOR AMOUNT	THIS MOD	NEW AMOUNT
BASE PERIOD			
Total Maximum Amount:	\$0.00	\$0.00	\$18,353,597.00
Funded Amount:	\$0.00	\$0.00	\$3,419,895.00
(End of clause)			

FAR 52.252-2 CLAUSES INCORPORATED BY REFERENCE. (FEB 1998)

This contract incorporates one or more clauses by reference, with the same force and effect as if they were given in full text. The full text of a clause may be accessed electronically at this/these address(es): FAR: <http://farsite.hill.af.mil/vmfara.htm> ; EPAAR: <http://farsite.hill.af.mil/vmepaara.htm>

CONTINUATION SHEET	REFERENCE NO. OF DOCUMENT BEING CONTINUED 68HE0H18D0008/68HERH19F0248/P00001	PAGE	OF
		2	7

NAME OF OFFEROR OR CONTRACTOR
Research Triangle Institute

ITEM NO. (A)	SUPPLIES/SERVICES (B)	QUANTITY (C)	UNIT (D)	UNIT PRICE (E)	AMOUNT (F)
	<p>LIST OF CHANGES:</p> <p>Reason for Modification: Other Administrative Action</p> <p>Clause titled "FAR 52.204-25, Prohibition on Contracting for Certain Telecommunications and Video Surveillance Services or Equipment. (AUG 2020)" is incorporated by reference.</p> <p>Payment:</p> <p>Period of Performance: 09/27/2019 to 09/26/2021</p>				

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT				1. CONTRACT ID CODE		PAGE OF PAGES	
2. AMENDMENT/MODIFICATION NUMBER		3. EFFECTIVE DATE 08/13/2020		4. REQUISITION/PURCHASE REQUISITION NUMBER		5. PROJECT NUMBER (If applicable)	
6. ISSUED BY Raoul D. Scott, Director OMS/ARM/OAS/Policy, Training and Oversight Division US Environmental Protection Agency, Mail Code 3802R 1200 Pennsylvania Avenue, NW Washington, DC 20004		CODE		7. ADMINISTERED BY (If other than Item 6)		CODE	
8. NAME AND ADDRESS OF CONTRACTOR (Number, street, county, State and ZIP Code) To All EPA Contractors				<input checked="" type="checkbox"/> (X)		9A. AMENDMENT OF SOLICITATION NUMBER	
				<input type="checkbox"/>		9B. DATED (SEE ITEM 11)	
				<input checked="" type="checkbox"/> (X)		10A. MODIFICATION OF CONTRACT/ORDER NUMBER To all EPA Contracts and Orders	
				<input type="checkbox"/>		10B. DATED (SEE ITEM 13)	
CODE		FACILITY CODE					
11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS							
<input type="checkbox"/> The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offers <input type="checkbox"/> is extended. <input type="checkbox"/> is not extended. Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended, by one of the following methods: (a) By completing items 8 and 15, and returning _____ copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or electronic communication which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by letter or electronic communication, provided each letter or electronic communication makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.							
12. ACCOUNTING AND APPROPRIATION DATA (If required)							
13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS. IT MODIFIES THE CONTRACT/ORDER NUMBER AS DESCRIBED IN ITEM 14.							
CHECK ONE	A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NUMBER IN ITEM 10A.						
<input type="checkbox"/>							
<input checked="" type="checkbox"/>	B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation data, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(b).						
<input type="checkbox"/>	C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:						
<input type="checkbox"/>	D. OTHER (Specify type of modification and authority)						
E. IMPORTANT: Contractor <input checked="" type="checkbox"/> is not <input type="checkbox"/> is required to sign this document and return _____ copies to the issuing office.							
14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract subject matter where feasible.)							
This contract/order is being modified in accordance with the applicability instructions in interim FAR Case 2019-009, and FAR 4.2105, requiring contracting officers to include FAR clause 52.204-25, Prohibition on Contracting for Certain Telecommunications and Video Surveillance Services or Equipment. See attached for the full text version of FAR 52.204-25. Contractor Acknowledgment of receipt required.							
Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.							
15A. NAME AND TITLE OF SIGNER (Type or print)				16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print)			
				Raoul D. Scott, Director Policy, Training and Oversight Division			
15B. CONTRACTOR/OFFEROR		15C. DATE SIGNED		16B. UNITED STATES OF AMERICA		16C. DATE SIGNED	
				RAOUL SCOTT Digitally signed by RAOUL SCOTT Date: 2020.07.30 11:40:17 -04'00'			
(Signature of person authorized to sign)				(Signature of Contracting Officer)			

52.204-25 Prohibition on Contracting for Certain Telecommunications and Video Surveillance Services or Equipment.

As prescribed in 4.2105(b) and in the applicability instructions in interim FAR Case 2019-009, insert the following clause:

Prohibition on Contracting for Certain Telecommunications and Video Surveillance Services or Equipment (Aug 2020)

(a) Definitions. As used in this clause—

Backhaul means intermediate links between the core network, or backbone network, and the small subnetworks at the edge of the network (e.g., connecting cell phones/towers to the core telephone network). Backhaul can be wireless (e.g., microwave) or wired (e.g., fiber optic, coaxial cable, Ethernet).

Covered foreign country means The People's Republic of China.

Covered telecommunications equipment or services means—

(1) Telecommunications equipment produced by Huawei Technologies Company or ZTE Corporation (or any subsidiary or affiliate of such entities);

(2) For the purpose of public safety, security of Government facilities, physical security surveillance of critical infrastructure, and other national security purposes, video surveillance and telecommunications equipment produced by Hytera Communications Corporation, Hangzhou Hikvision Digital Technology Company, or Dahua Technology Company (or any subsidiary or affiliate of such entities);

(3) Telecommunications or video surveillance services provided by such entities or using such equipment; or

(4) Telecommunications or video surveillance equipment or services produced or provided by an entity that the Secretary of Defense, in consultation with the Director of National Intelligence or the Director of the Federal Bureau of Investigation, reasonably believes to be an entity owned or controlled by, or otherwise connected to, the government of a covered foreign country.

Critical technology means—

(1) Defense articles or defense services included on the United States Munitions List set forth in the International Traffic in Arms Regulations under subchapter M of chapter I of title 22, Code of Federal Regulations;

(2) Items included on the Commerce Control List set forth in Supplement No. 1 to part 774 of the Export Administration Regulations under subchapter C of chapter VII of title 15, Code of Federal Regulations, and controlled-

(i) Pursuant to multilateral regimes, including for reasons relating to national security, chemical and biological weapons proliferation, nuclear nonproliferation, or missile technology; or

(ii) For reasons relating to regional stability or surreptitious listening;

(3) Specially designed and prepared nuclear equipment, parts and components, materials, software, and technology covered by part 810 of title 10, Code of Federal Regulations (relating to assistance to foreign atomic energy activities);

(4) Nuclear facilities, equipment, and material covered by part 110 of title 10, Code of Federal Regulations (relating to export and import of nuclear equipment and material);

(5) Select agents and toxins covered by part 331 of title 7, Code of Federal Regulations, part 121 of title 9 of such Code, or part 73 of title 42 of such Code; or

(6) Emerging and foundational technologies controlled pursuant to section 1758 of the Export Control Reform Act of 2018 (50 U.S.C. 4817).

Interconnection arrangements means arrangements governing the physical connection of two or more networks to allow the use of another's network to hand off traffic where it is ultimately delivered (e.g., connection of a customer of telephone provider A to a customer of telephone company B) or sharing data and other information resources.

Reasonable inquiry means an inquiry designed to uncover any information in the entity's possession about the identity of the producer or provider of covered telecommunications equipment or services used by the entity that excludes the need to include an internal or third-party audit.

Roaming means cellular communications services (e.g., voice, video, data) received from a visited network when unable to connect to the facilities of the home network either because signal coverage is too weak or because traffic is too high.

Substantial or essential component means any component necessary for the proper function or performance of a piece of equipment, system, or service.

(b) Prohibition. (1) Section 889(a)(1)(A) of the John S. McCain National Defense Authorization Act for Fiscal Year 2019 (Pub. L. 115-232) prohibits the head of an executive agency on or after August 13, 2019, from procuring or obtaining, or extending or renewing a contract to procure or obtain, any equipment, system, or service that uses covered telecommunications equipment or services as a substantial or essential component of any system, or as critical technology as part of any system. The Contractor is prohibited from providing to the Government any equipment, system, or service that uses covered telecommunications equipment or services as a substantial or essential component of any system, or as critical technology as part of any system, unless an exception at paragraph (c) of this clause applies or the covered telecommunication equipment or services are covered by a waiver described in FAR 4.2104.

(2) Section 889(a)(1)(B) of the John S. McCain National Defense Authorization Act for Fiscal Year 2019 (Pub. L. 115-232) prohibits the head of an executive agency on or after August 13, 2020, from entering into a contract, or extending or renewing a contract, with an entity that uses any equipment, system, or service that uses covered telecommunications equipment or services as a substantial or essential component of any system, or as critical technology as part of any system, unless an exception at paragraph (c) of this clause applies or the covered telecommunication equipment or services are covered by a waiver described in FAR 4.2104. This prohibition applies to the use of covered telecommunications equipment or services, regardless of whether that use is in performance of work under a Federal contract.

(c) *Exceptions.* This clause does not prohibit contractors from providing—

(1) A service that connects to the facilities of a third-party, such as backhaul, roaming, or interconnection arrangements; or

(2) Telecommunications equipment that cannot route or redirect user data traffic or permit visibility into any user data or packets that such equipment transmits or otherwise handles.

(d) Reporting requirement.

(1) In the event the Contractor identifies covered telecommunications equipment or services used as a substantial or essential component of any system, or as critical technology as part of any system, during contract performance, or the Contractor is notified of such by a subcontractor at any tier or by any other source, the Contractor shall report the information in paragraph (d)(2) of this clause to the Contracting Officer, unless elsewhere in this contract are established procedures for reporting the information; in the case of the Department of Defense, the Contractor shall report to the website at <https://dibnet.dod.mil>. For indefinite delivery contracts, the Contractor shall report to the Contracting Officer for the indefinite delivery contract and the Contracting Officer(s) for any affected order or, in the case of the Department of Defense, identify both the indefinite delivery contract and any affected orders in the report provided at <https://dibnet.dod.mil>.


(2) The Contractor shall report the following information pursuant to paragraph (d)(1) of this clause

(i) Within one business day from the date of such identification or notification: the contract number; the order number(s), if applicable; supplier name; supplier unique entity identifier (if known); supplier Commercial and Government Entity (CAGE) code (if known); brand; model number (original equipment manufacturer number, manufacturer part number, or wholesaler number); item description; and any readily available information about mitigation actions undertaken or recommended.

(ii) Within 10 business days of submitting the information in paragraph (d)(2)(i) of this clause: any further available information about mitigation actions undertaken or recommended. In addition, the Contractor shall describe the efforts it undertook to prevent use or submission of covered telecommunications equipment or services, and any additional efforts that will be incorporated to prevent future use or submission of covered telecommunications equipment or services.

(e) *Subcontracts*. The Contractor shall insert the substance of this clause, including this paragraph (e) and excluding paragraph (b)(2), in all subcontracts and other contractual instruments, including subcontracts for the acquisition of commercial items.

(End of clause)

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT				1. CONTRACT ID CODE		PAGE OF PAGES	
						1 8	
2. AMENDMENT/MODIFICATION NO.		3. EFFECTIVE DATE		4. REQUISITION/PURCHASE REQ. NO.		5. PROJECT NO. (If applicable)	
P00002		See Block 16C		See Schedule			
6. ISSUED BY		CODE		7. ADMINISTERED BY (If other than Item 6)		CODE	
CAD							
CAD US Environmental Protection Agency 26 West Martin Luther King Drive Mail Code: W136 Cincinnati OH 45268-0001							
8. NAME AND ADDRESS OF CONTRACTOR (No., street, county, State and ZIP Code)				(x)			
Research Triangle Institute Attn: Linda Eubanks PO BOX 12194 RESEARCH TRIANGLE PARK NC 277092194							
				9A. AMENDMENT OF SOLICITATION NO.			
				9B. DATED (SEE ITEM 11)			
				x			
				10A. MODIFICATION OF CONTRACT/ORDER NO.			
				68HE0H18D0008			
				68HERH19F0248			
				10B. DATED (SEE ITEM 13)			
				09/27/2019			
CODE 004868105		FACILITY CODE					
11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS							
<input type="checkbox"/> The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offers <input type="checkbox"/> is extended. <input type="checkbox"/> is not extended. Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended, by one of the following methods: (a) By completing Items 8 and 15, and returning _____ copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or electronic communication which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGEMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by letter or electronic communication, provided each letter or electronic communication makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.							
12. ACCOUNTING AND APPROPRIATION DATA (If required)				Net Increase:		\$584,442.00	
See Schedule							
13. THIS ITEM ONLY APPLIES TO MODIFICATION OF CONTRACTS/ORDERS. IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.							
CHECK ONE	A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.						
	B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation data, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(b).						
	C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:						
X	D. OTHER (Specify type of modification and authority) IAW FAR 52.217-7, Option for Increased Quantity - Separately Priced Line Item (Mar 1989)						
E. IMPORTANT: Contractor <input checked="" type="checkbox"/> is not <input type="checkbox"/> is required to sign this document and return _____ copies to the issuing office.							
14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract subject matter where feasible.)							
DUNS Number: 004868105+7709							
Multiple Award ID/IQ Technical Support for the Endocrine Disruptor Screening Program Task Order:							
Technical Support for the Development and Implementation of Pathway-Based Systematic Reviews, Universe of Chemicals, and Scientific IT Platform							
TOCOR: Kristan Markey Max Expire Date: 09/26/2023 Invoice Approver: Kristan Markey Alt Invoice App: Ronnie "Joe" Bever							
This unilateral Modification P00002 is issued to:							
1. Exercise and fully fund Optional Contract Line Item Numbers (CLINs) 0007, 0008, 0009, 0012, 0013, 0018, and 0019. Issuance of this modification constitutes the Government's Continued ...							
Except as provided herein, all terms and conditions of the document referenced in Item 9 A or 10A, as heretofore changed, remains unchanged and in full force and effect.							
15A. NAME AND TITLE OF SIGNER (Type or print)				16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print)			
				Mark Cranley			
15B. CONTRACTOR/OFFEROR		15C. DATE SIGNED		16B. UNITED STATES OF AMERICA		16C. DATE SIGNED	
				 ELECTRONIC SIGNATURE		03/17/2021	
(Signature of person authorized to sign)				(Signature of Contracting Officer)			

CONTINUATION SHEET	REFERENCE NO. OF DOCUMENT BEING CONTINUED 68HE0H18D0008/68HERH19F0248/P00002	PAGE	OF
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NAME OF OFFEROR OR CONTRACTOR
Research Triangle Institute

ITEM NO. (A)	SUPPLIES/SERVICES (B)	QUANTITY (C)	UNIT (D)	UNIT PRICE (E)	AMOUNT (F)
	<p>written notice of option exercise in accordance with FAR 52.217-7, Option for Increased Quantity - Separately Priced Line Item (Mar 1989); and</p> <p>2. Revise the Task Order's Local Clause EPA-G-42-101, Contract Administration Representatives, as follows:</p> <p>Contract-Level Contracting Officer's Representatives (CLCORs)/Project Officers for this Task Order are as follows:</p> <p>CLCOR: Cathy Stewart U.S. EPA 2777 South Crystal Drive Mail Code: 7502P Arlington, VA 22202 Phone: 703-305-7711 Email: Stewart.Cathy@epa.gov</p> <p>Alternate CLCOR: Latangila Edwards U.S. EPA 2777 South Crystal Drive Mail Code: 7509P Arlington, VA 22202 Phone: 703-305-7170 Email: Edwards.Latangila@epa.gov</p> <p>Task Order Contracting Officer's Representatives (TOCORs)/Project Officers for this Task Order are as follows:</p> <p>TOCOR: Kristan Markey U.S. EPA 1201 Constitution Ave NW Mail Code: 7203M Washington, DC 20004 Phone: 202-564-8716 Email: Markey.Kristan@epa.gov</p> <p>Alternate TOCOR: Ronnie "Joe" Bever U.S. EPA 1201 Constitution Ave NW Mail Code: 7203M Washington, DC 20004 Phone: 202-564-8405 Continued ...</p>				

CONTINUATION SHEET	REFERENCE NO. OF DOCUMENT BEING CONTINUED 68HE0H18D0008/68HERH19F0248/P00002	PAGE	OF
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NAME OF OFFEROR OR CONTRACTOR
Research Triangle Institute

ITEM NO. (A)	SUPPLIES/SERVICES (B)	QUANTITY (C)	UNIT (D)	UNIT PRICE (E)	AMOUNT (F)
	<p>Email: Bever.Ronnie@epa.gov</p> <p>Contracting Officials responsible for administering this contract are as follows:</p> <p>Administrative Contracting Officer (ACO): Sean Gifford U.S. EPA 26 West Martin Luther King Drive Mail Code: W136A Cincinnati, OH 45268 Phone: 513-487-2506 Email: Gifford.Sean@epa.gov</p> <p>(End of Clause)</p> <p>All other terms and conditions remain unchanged and in full force and effect.</p> <p>LIST OF CHANGES: Reason for Modification: Exercise an Option Obligated Amount for this Modification: \$584,442.00 New Total Obligated Amount for this Award: \$4,004,337.00</p> <p>CHANGES FOR LINE ITEM NUMBER: 0007 Obligated Amount for this Modification: \$44,431.00 Exercised option</p> <p>NEW ACCOUNTING CODE ADDED: Account code: 20-21-B-C2-000C54-2505-2032IO0034-001 Beginning FiscalYear 20 Ending Fiscal Year 21 Fund (Appropriation) B Budget Organization C2 Program (PRC) 000C54 Budget (BOC) 2505 Job # (Site/Project) Cost Organization DCN-LineID 2032IO0034-001 Quantity: 0 Amount: \$44,431.00 Percent: 0 Subject To Funding: N Payment Address: RTP Finance Center US Environmental Protection Agency RTP-Finance Center (AA216-01) Continued ...</p>				

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NAME OF OFFEROR OR CONTRACTOR
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ITEM NO. (A)	SUPPLIES/SERVICES (B)	QUANTITY (C)	UNIT (D)	UNIT PRICE (E)	AMOUNT (F)
	109 TW Alexander Drive www2.epa.gov/financial/contracts Durham NC 27711 CHANGES FOR LINE ITEM NUMBER: 0008 Obligated Amount for this Modification: \$46,701.00 Exercised option NEW ACCOUNTING CODE ADDED: Account code: 20-21-B-C2-000C54-2505-2032IO0034-001 Beginning FiscalYear 20 Ending Fiscal Year 21 Fund (Appropriation) B Budget Organization C2 Program (PRC) 000C54 Budget (BOC) 2505 Job # (Site/Project) Cost Organization DCN-LineID 2032IO0034-001 Quantity: 0 Amount: \$46,701.00 Percent: 0 Subject To Funding: N Payment Address: RTP Finance Center US Environmental Protection Agency RTP-Finance Center (AA216-01) 109 TW Alexander Drive www2.epa.gov/financial/contracts Durham NC 27711 CHANGES FOR LINE ITEM NUMBER: 0009 Obligated Amount for this Modification: \$118,336.00 Exercised option NEW ACCOUNTING CODE ADDED: Account code: 20-21-B-C2-000C54-2505-2032IO0034-001 Beginning FiscalYear 20 Ending Fiscal Year 21 Fund (Appropriation) B Budget Organization C2 Program (PRC) 000C54 Budget (BOC) 2505 Job # (Site/Project) Cost Organization DCN-LineID 2032IO0034-001 Quantity: 0 Continued ...				

CONTINUATION SHEET	REFERENCE NO. OF DOCUMENT BEING CONTINUED 68HE0H18D0008/68HERH19F0248/P00002	PAGE	OF
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NAME OF OFFEROR OR CONTRACTOR
Research Triangle Institute

ITEM NO. (A)	SUPPLIES/SERVICES (B)	QUANTITY (C)	UNIT (D)	UNIT PRICE (E)	AMOUNT (F)
	<p>Amount: \$118,336.00 Percent: 0 Subject To Funding: N Payment Address: RTP Finance Center US Environmental Protection Agency RTP-Finance Center (AA216-01) 109 TW Alexander Drive www2.epa.gov/financial/contracts Durham NC 27711</p> <p>CHANGES FOR LINE ITEM NUMBER: 0012 Obligated Amount for this Modification: \$42,993.00 Exercised option</p> <p>NEW ACCOUNTING CODE ADDED: Account code: 20-21-B-C2-000C54-2505-2032IO0034-001 Beginning FiscalYear 20 Ending Fiscal Year 21 Fund (Appropriation) B Budget Organization C2 Program (PRC) 000C54 Budget (BOC) 2505 Job # (Site/Project) Cost Organization DCN-LineID 2032IO0034-001 Quantity: 0 Amount: \$42,993.00 Percent: 0 Subject To Funding: N Payment Address: RTP Finance Center US Environmental Protection Agency RTP-Finance Center (AA216-01) 109 TW Alexander Drive www2.epa.gov/financial/contracts Durham NC 27711</p> <p>CHANGES FOR LINE ITEM NUMBER: 0013 Obligated Amount for this Modification: \$125,825.00 Exercised option</p> <p>NEW ACCOUNTING CODE ADDED: Account code: 20-21-B-C2-000C54-2505-2032IO0034-001 Beginning FiscalYear 20 Ending Fiscal Year 21 Fund (Appropriation) B Continued ...</p>				

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NAME OF OFFEROR OR CONTRACTOR
Research Triangle Institute

ITEM NO. (A)	SUPPLIES/SERVICES (B)	QUANTITY (C)	UNIT (D)	UNIT PRICE (E)	AMOUNT (F)
	Budget Organization C2 Program (PRC) 000C54 Budget (BOC) 2505 Job # (Site/Project) Cost Organization DCN-LineID 2032IO0034-001 Quantity: 0 Amount: \$125,825.00 Percent: 0 Subject To Funding: N Payment Address: RTP Finance Center US Environmental Protection Agency RTP-Finance Center (AA216-01) 109 TW Alexander Drive www2.epa.gov/financial/contracts Durham NC 27711 CHANGES FOR LINE ITEM NUMBER: 0018 Obligated Amount for this Modification: \$97,816.00 Exercised option NEW ACCOUNTING CODE ADDED: Account code: 20-21-B-C2-000C54-2505-2032IO0034-001 Beginning FiscalYear 20 Ending Fiscal Year 21 Fund (Appropriation) B Budget Organization C2 Program (PRC) 000C54 Budget (BOC) 2505 Job # (Site/Project) Cost Organization DCN-LineID 2032IO0034-001 Quantity: 0 Amount: \$49,392.00 Percent: 0 Subject To Funding: N Payment Address: RTP Finance Center US Environmental Protection Agency RTP-Finance Center (AA216-01) 109 TW Alexander Drive www2.epa.gov/financial/contracts Durham NC 27711 NEW ACCOUNTING CODE ADDED: Account code: 21-22-B-32-000C54-2505-2032IO0034-002 Beginning FiscalYear 21 Continued ...				


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NAME OF OFFEROR OR CONTRACTOR
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ITEM NO. (A)	SUPPLIES/SERVICES (B)	QUANTITY (C)	UNIT (D)	UNIT PRICE (E)	AMOUNT (F)
	<p>Ending Fiscal Year 22 Fund (Appropriation) B Budget Organization 32 Program (PRC) 000C54 Budget (BOC) 2505 Job # (Site/Project) Cost Organization DCN-LineID 2032IO0034-002 Quantity: 0 Amount: \$48,424.00 Percent: 0 Subject To Funding: N Payment Address: RTP Finance Center US Environmental Protection Agency RTP-Finance Center (AA216-01) 109 TW Alexander Drive www2.epa.gov/financial/contracts Durham NC 27711</p> <p>CHANGES FOR LINE ITEM NUMBER: 0019 Obligated Amount for this Modification: \$108,340.00 Exercised option</p> <p>NEW ACCOUNTING CODE ADDED: Account code: 21-22-B-32-000C54-2505-2032IO0034-002 Beginning FiscalYear 21 Ending Fiscal Year 22 Fund (Appropriation) B Budget Organization 32 Program (PRC) 000C54 Budget (BOC) 2505 Job # (Site/Project) Cost Organization DCN-LineID 2032IO0034-002 Quantity: 0 Amount: \$108,340.00 Percent: 0 Subject To Funding: N Payment Address: RTP Finance Center US Environmental Protection Agency RTP-Finance Center (AA216-01) 109 TW Alexander Drive www2.epa.gov/financial/contracts Durham NC 27711</p> <p>Continued ...</p>				

NAME OF OFFEROR OR CONTRACTOR
 Research Triangle Institute

ITEM NO. (A)	SUPPLIES/SERVICES (B)	QUANTITY (C)	UNIT (D)	UNIT PRICE (E)	AMOUNT (F)
	Payment: RTP Finance Center US Environmental Protection Agency RTP-Finance Center (AA216-01) 109 TW Alexander Drive www2.epa.gov/financial/contracts Durham NC 27711 Period of Performance: 09/27/2019 to 09/26/2021				

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT				1. CONTRACT ID CODE		PAGE OF PAGES	
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2. AMENDMENT/MODIFICATION NO.		3. EFFECTIVE DATE		4. REQUISITION/PURCHASE REQ. NO.		5. PROJECT NO. (If applicable)	
P00003		See Block 16C		PR-OCSP-21-00463			
6. ISSUED BY		CODE		7. ADMINISTERED BY (If other than Item 6)		CODE	
CAD							
CAD							
US Environmental Protection Agency							
26 West Martin Luther King Drive							
Mail Code: W136							
Cincinnati OH 45268-0001							
8. NAME AND ADDRESS OF CONTRACTOR (No., street, county, State and ZIP Code)				(x)			
Research Triangle Institute							
Attn: Linda Eubanks							
PO BOX 12194							
RESEARCH TRIANGLE PARK NC 277092194							
				9A. AMENDMENT OF SOLICITATION NO.			
				9B. DATED (SEE ITEM 11)			
				x 10A. MODIFICATION OF CONTRACT/ORDER NO.			
				68HE0H18D0008			
				68HERH19F0248			
				10B. DATED (SEE ITEM 13)			
				09/27/2019			
CODE 004868105		FACILITY CODE					
11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS							
<input type="checkbox"/> The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offers <input type="checkbox"/> is extended. <input type="checkbox"/> is not extended. Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended, by one of the following methods: (a) By completing Items 8 and 15, and returning _____ copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or electronic communication which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGEMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by letter or electronic communication, provided each letter or electronic communication makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.							
12. ACCOUNTING AND APPROPRIATION DATA (If required)				Net Increase:		\$884,439.00	
See Schedule							
13. THIS ITEM ONLY APPLIES TO MODIFICATION OF CONTRACTS/ORDERS. IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.							
CHECK ONE		A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.					
		B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation data, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(b).					
x		C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF: FAR 52.217-9, Option to Extend the Term of the Contract					
		D. OTHER (Specify type of modification and authority)					
E. IMPORTANT: Contractor <input type="checkbox"/> is not <input checked="" type="checkbox"/> is required to sign this document and return <u>1</u> copies to the issuing office.							
14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract subject matter where feasible.)							
DUNS Number: 004868105+7709							
Multiple Award ID/IQ Technical Support for the Endocrine Disruptor Screening Program Task Order:							
Technical Support for the Development and Implementation of Pathway-Based Systematic Reviews, Universe of Chemicals, and Scientific IT Platform							
TOCOR: Kristan Markey Max Expire Date: 09/26/2023 Invoice Approver: Kristan Markey Alt							
Invoice App: Ronnie "Joe" Bever							
The purpose of this bilateral Modification P00003 is to							
1. Exercise Option Period 1 under Contract Line Item Number (CLIN) 0021 with an associated period of performance from 09/27/2021 to 09/26/2022;							
Continued ...							
Except as provided herein, all terms and conditions of the document referenced in Item 9 A or 10A, as heretofore changed, remains unchanged and in full force and effect.							
15A. NAME AND TITLE OF SIGNER (Type or print)				16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print)			
				Sean Gifford			
15B. CONTRACTOR/OFFEROR		15C. DATE SIGNED		16B. UNITED STATES OF AMERICA		16C. DATE SIGNED	
				 (Electronic Signature of Contracting Officer)		09/15/2021	
(Signature of person authorized to sign)							

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NAME OF OFFEROR OR CONTRACTOR
Research Triangle Institute

ITEM NO. (A)	SUPPLIES/SERVICES (B)	QUANTITY (C)	UNIT (D)	UNIT PRICE (E)	AMOUNT (F)
	<p>2. Fully fund CLIN 0021 in the amount of \$120,555.00; and</p> <p>3. Exercise the following Optional CLINs and fund by the associated amounts:</p> <p>CLIN 0022: \$250,000.00 CLIN 0023: \$50,000.00 CLIN 0027: \$47,192.00 CLIN 0029: \$50,000.00 CLIN 0033: \$50,000.00 CLIN 0035: \$50,000.00 CLIN 0037: \$28,941.00 CLIN 0039: \$103,288.00 CLIN 0040: \$114,466.00 CLIN 0041: \$19,997.00</p> <p>All other terms and conditions remain unchanged and in full force and effect.</p> <p>LIST OF CHANGES: Reason for Modification: Exercise an Option Period Of Performance End Date changed from 26-SEP-21 to 26-SEP-22 Obligated Amount for this Modification: \$884,439.00 New Total Obligated Amount for this Award: \$4,888,776.00</p> <p>CHANGES FOR LINE ITEM NUMBER: 0021 Obligated Amount for this Modification: \$120,555.00 Exercised option</p> <p>NEW ACCOUNTING CODE ADDED: Account code: 21-22-B-32D-000C54-2505-2132IO0051-001 Beginning FiscalYear 21 Ending Fiscal Year 22 Fund (Appropriation) B Budget Organization 32D Program (PRC) 000C54 Budget (BOC) 2505 Job # (Site/Project) Cost Organization DCN-LineID 2132IO0051-001 Quantity: 0 Amount: \$120,555.00 Percent: 0 Continued ...</p>				

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NAME OF OFFEROR OR CONTRACTOR
Research Triangle Institute

ITEM NO. (A)	SUPPLIES/SERVICES (B)	QUANTITY (C)	UNIT (D)	UNIT PRICE (E)	AMOUNT (F)
	<p>Subject To Funding: N</p> <p>Payment Address:</p> <p>RTP Finance Center</p> <p>US Environmental Protection Agency</p> <p>RTP-Finance Center (AA216-01)</p> <p>109 TW Alexander Drive</p> <p>www2.epa.gov/financial/contracts</p> <p>Durham NC 27711</p> <p>CHANGES FOR LINE ITEM NUMBER: 0022</p> <p>Obligated Amount for this Modification:</p> <p>\$250,000.00</p> <p>Incremental Funded Amount changed from \$0.00 to \$250,000.00</p> <p>Exercised option</p> <p>NEW ACCOUNTING CODE ADDED:</p> <p>Account code:</p> <p>21-22-B-32D-000C54-2505-2132IO0051-001</p> <p>Beginning FiscalYear 21</p> <p>Ending Fiscal Year 22</p> <p>Fund (Appropriation) B</p> <p>Budget Organization 32D</p> <p>Program (PRC) 000C54</p> <p>Budget (BOC) 2505</p> <p>Job # (Site/Project)</p> <p>Cost Organization</p> <p>DCN-LineID 2132IO0051-001</p> <p>Quantity: 0</p> <p>Amount: \$250,000.00</p> <p>Percent: 0</p> <p>Subject To Funding: N</p> <p>Payment Address:</p> <p>RTP Finance Center</p> <p>US Environmental Protection Agency</p> <p>RTP-Finance Center (AA216-01)</p> <p>109 TW Alexander Drive</p> <p>www2.epa.gov/financial/contracts</p> <p>Durham NC 27711</p> <p>CHANGES FOR LINE ITEM NUMBER: 0023</p> <p>Obligated Amount for this Modification: \$50,000.00</p> <p>Incremental Funded Amount changed from \$0.00 to \$50,000.00</p> <p>Exercised option</p> <p>NEW ACCOUNTING CODE ADDED:</p> <p>Account code:</p> <p>21-22-B-32D-000C54-2505-2132IO0051-001</p> <p>Beginning FiscalYear 21</p> <p>Continued ...</p>				

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NAME OF OFFEROR OR CONTRACTOR
Research Triangle Institute

ITEM NO. (A)	SUPPLIES/SERVICES (B)	QUANTITY (C)	UNIT (D)	UNIT PRICE (E)	AMOUNT (F)
	<p>Ending Fiscal Year 22 Fund (Appropriation) B Budget Organization 32D Program (PRC) 000C54 Budget (BOC) 2505 Job # (Site/Project) Cost Organization DCN-LineID 2132IO0051-001 Quantity: 0 Amount: \$50,000.00 Percent: 0 Subject To Funding: N Payment Address: RTP Finance Center US Environmental Protection Agency RTP-Finance Center (AA216-01) 109 TW Alexander Drive www2.epa.gov/financial/contracts Durham NC 27711</p> <p>CHANGES FOR LINE ITEM NUMBER: 0027 Obligated Amount for this Modification: \$47,192.00 Exercised option</p> <p>NEW ACCOUNTING CODE ADDED: Account code: 21-22-B-32D-000C54-2505-2132IO0051-001 Beginning FiscalYear 21 Ending Fiscal Year 22 Fund (Appropriation) B Budget Organization 32D Program (PRC) 000C54 Budget (BOC) 2505 Job # (Site/Project) Cost Organization DCN-LineID 2132IO0051-001 Quantity: 0 Amount: \$47,192.00 Percent: 0 Subject To Funding: N Payment Address: RTP Finance Center US Environmental Protection Agency RTP-Finance Center (AA216-01) 109 TW Alexander Drive www2.epa.gov/financial/contracts Durham NC 27711</p> <p>CHANGES FOR LINE ITEM NUMBER: 0029 Incremental Funded Amount changed from \$0.00 to Continued ...</p>				

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NAME OF OFFEROR OR CONTRACTOR
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ITEM NO. (A)	SUPPLIES/SERVICES (B)	QUANTITY (C)	UNIT (D)	UNIT PRICE (E)	AMOUNT (F)
	<p>\$50,000.00</p> <p>Exercised option</p> <p>NEW ACCOUNTING CODE ADDED: Account code: 21-22-B-32D-000C54-2505-2132IO0051-001 Beginning FiscalYear 21 Ending Fiscal Year 22 Fund (Appropriation) B Budget Organization 32D Program (PRC) 000C54 Budget (BOC) 2505 Job # (Site/Project) Cost Organization DCN-LineID 2132IO0051-001 Quantity: 0 Amount: \$50,000.00 Percent: 0 Subject To Funding: N Payment Address: RTP Finance Center US Environmental Protection Agency RTP-Finance Center (AA216-01) 109 TW Alexander Drive www2.epa.gov/financial/contracts Durham NC 27711</p> <p>CHANGES FOR LINE ITEM NUMBER: 0033 Obligated Amount for this Modification: \$50,000.00 Incremental Funded Amount changed from \$0.00 to \$50,000.00 Exercised option</p> <p>NEW ACCOUNTING CODE ADDED: Account code: 21-22-B-32D-000C54-2505-2132IO0051-001 Beginning FiscalYear 21 Ending Fiscal Year 22 Fund (Appropriation) B Budget Organization 32D Program (PRC) 000C54 Budget (BOC) 2505 Job # (Site/Project) Cost Organization DCN-LineID 2132IO0051-001 Quantity: 0 Amount: \$50,000.00 Percent: 0 Subject To Funding: N Payment Address: Continued ...</p>				

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NAME OF OFFEROR OR CONTRACTOR
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ITEM NO. (A)	SUPPLIES/SERVICES (B)	QUANTITY (C)	UNIT (D)	UNIT PRICE (E)	AMOUNT (F)
	RTP Finance Center US Environmental Protection Agency RTP-Finance Center (AA216-01) 109 TW Alexander Drive www2.epa.gov/financial/contracts Durham NC 27711 CHANGES FOR LINE ITEM NUMBER: 0035 Obligated Amount for this Modification: \$50,000.00 Incremental Funded Amount changed from \$0.00 to \$50,000.00 Exercised option NEW ACCOUNTING CODE ADDED: Account code: 21-22-B-32D-000C54-2505-2132IO0051-001 Beginning FiscalYear 21 Ending Fiscal Year 22 Fund (Appropriation) B Budget Organization 32D Program (PRC) 000C54 Budget (BOC) 2505 Job # (Site/Project) Cost Organization DCN-LineID 2132IO0051-001 Quantity: 0 Amount: \$50,000.00 Percent: 0 Subject To Funding: N Payment Address: RTP Finance Center US Environmental Protection Agency RTP-Finance Center (AA216-01) 109 TW Alexander Drive www2.epa.gov/financial/contracts Durham NC 27711 CHANGES FOR LINE ITEM NUMBER: 0037 Obligated Amount for this Modification: \$28,941.00 Exercised option NEW ACCOUNTING CODE ADDED: Account code: 21-22-B-32D-000C54-2505-2132IO0051-001 Beginning FiscalYear 21 Ending Fiscal Year 22 Fund (Appropriation) B Budget Organization 32D Program (PRC) 000C54 Budget (BOC) 2505 Continued ...				

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ITEM NO. (A)	SUPPLIES/SERVICES (B)	QUANTITY (C)	UNIT (D)	UNIT PRICE (E)	AMOUNT (F)
	<p>Job # (Site/Project)</p> <p>Cost Organization</p> <p>DCN-LineID 2132IO0051-001</p> <p>Quantity: 0</p> <p>Amount: \$28,941.00</p> <p>Percent: 0</p> <p>Subject To Funding: N</p> <p>Payment Address:</p> <p>RTP Finance Center</p> <p>US Environmental Protection Agency</p> <p>RTP-Finance Center (AA216-01)</p> <p>109 TW Alexander Drive</p> <p>www2.epa.gov/financial/contracts</p> <p>Durham NC 27711</p> <p>CHANGES FOR LINE ITEM NUMBER: 0039</p> <p>Obligated Amount for this Modification:</p> <p>\$103,288.00</p> <p>Exercised option</p> <p>NEW ACCOUNTING CODE ADDED:</p> <p>Account code:</p> <p>21-22-B-32D-000C54-2505-2132IO0051-001</p> <p>Beginning FiscalYear 21</p> <p>Ending Fiscal Year 22</p> <p>Fund (Appropriation) B</p> <p>Budget Organization 32D</p> <p>Program (PRC) 000C54</p> <p>Budget (BOC) 2505</p> <p>Job # (Site/Project)</p> <p>Cost Organization</p> <p>DCN-LineID 2132IO0051-001</p> <p>Quantity: 0</p> <p>Amount: \$103,288.00</p> <p>Percent: 0</p> <p>Subject To Funding: N</p> <p>Payment Address:</p> <p>RTP Finance Center</p> <p>US Environmental Protection Agency</p> <p>RTP-Finance Center (AA216-01)</p> <p>109 TW Alexander Drive</p> <p>www2.epa.gov/financial/contracts</p> <p>Durham NC 27711</p> <p>CHANGES FOR LINE ITEM NUMBER: 0040</p> <p>Obligated Amount for this Modification:</p> <p>\$114,466.00</p> <p>Exercised option</p> <p>NEW ACCOUNTING CODE ADDED:</p> <p>Continued ...</p>				


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ITEM NO. (A)	SUPPLIES/SERVICES (B)	QUANTITY (C)	UNIT (D)	UNIT PRICE (E)	AMOUNT (F)
	Account code: 21-22-B-32D-000C54-2505-2132IO0051-001 Beginning FiscalYear 21 Ending Fiscal Year 22 Fund (Appropriation) B Budget Organization 32D Program (PRC) 000C54 Budget (BOC) 2505 Job # (Site/Project) Cost Organization DCN-LineID 2132IO0051-001 Quantity: 0 Amount: \$114,466.00 Percent: 0 Subject To Funding: N Payment Address: RTP Finance Center US Environmental Protection Agency RTP-Finance Center (AA216-01) 109 TW Alexander Drive www2.epa.gov/financial/contracts Durham NC 27711 CHANGES FOR LINE ITEM NUMBER: 0041 Obligated Amount for this Modification: \$19,997.00 Exercised option NEW ACCOUNTING CODE ADDED: Account code: 21-22-B-32D-000C54-2505-2132IO0051-001 Beginning FiscalYear 21 Ending Fiscal Year 22 Fund (Appropriation) B Budget Organization 32D Program (PRC) 000C54 Budget (BOC) 2505 Job # (Site/Project) Cost Organization DCN-LineID 2132IO0051-001 Quantity: 0 Amount: \$19,997.00 Percent: 0 Subject To Funding: N Payment Address: RTP Finance Center US Environmental Protection Agency RTP-Finance Center (AA216-01) 109 TW Alexander Drive www2.epa.gov/financial/contracts Durham NC 27711 Continued ...				

NAME OF OFFEROR OR CONTRACTOR
 Research Triangle Institute

ITEM NO. (A)	SUPPLIES/SERVICES (B)	QUANTITY (C)	UNIT (D)	UNIT PRICE (E)	AMOUNT (F)
	Payment: RTP Finance Center US Environmental Protection Agency RTP-Finance Center (AA216-01) 109 TW Alexander Drive www2.epa.gov/financial/contracts Durham NC 27711 Period of Performance: 09/27/2019 to 09/26/2022				

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT				1. CONTRACT ID CODE		PAGE OF PAGES 1 5	
2. AMENDMENT/MODIFICATION NO. P00004		3. EFFECTIVE DATE See Block 16C		4. REQUISITION/PURCHASE REQ. NO. See Schedule		5. PROJECT NO. (If applicable)	
6. ISSUED BY CAD US Environmental Protection Agency 26 West Martin Luther King Drive Mail Code: W136 Cincinnati OH 45268-0001		CODE CAD		7. ADMINISTERED BY (If other than Item 6)		CODE	
8. NAME AND ADDRESS OF CONTRACTOR (No., street, county, State and ZIP Code) Research Triangle Institute Attn: Linda Eubanks PO BOX 12194 RESEARCH TRIANGLE PARK NC 277092194				(x)		9A. AMENDMENT OF SOLICITATION NO.	
						9B. DATED (SEE ITEM 11)	
				x		10A. MODIFICATION OF CONTRACT/ORDER NO. 68HE0H18D0008 68HERH19F0248	
						10B. DATED (SEE ITEM 13) 09/27/2019	
CODE 004868105		FACILITY CODE					
11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS							
<input type="checkbox"/> The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offers <input type="checkbox"/> is extended. <input type="checkbox"/> is not extended. Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended, by one of the following methods: (a) By completing Items 8 and 15, and returning _____ copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or electronic communication which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGEMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by letter or electronic communication, provided each letter or electronic communication makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.							
12. ACCOUNTING AND APPROPRIATION DATA (If required) See Schedule							
13. THIS ITEM ONLY APPLIES TO MODIFICATION OF CONTRACTS/ORDERS. IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.							
CHECK ONE		A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.					
		B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation data, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(b).					
x		C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF: FAR 52.212-4(c), Changes					
		D. OTHER (Specify type of modification and authority)					
E. IMPORTANT: Contractor <input type="checkbox"/> is not <input checked="" type="checkbox"/> is required to sign this document and return <u>1</u> copies to the issuing office.							
14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract subject matter where feasible.) DUNS Number: 004868105+7709 Multiple Award ID/IQ Technical Support for the Endocrine Disruptor Screening Program Task Order: Technical Support for the Development and Implementation of Pathway-Based Systematic Reviews, Universe of Chemicals, and Scientific IT Platform TOCOR: Kristan Markey Max Expire Date: 09/26/2023 Invoice Approver: Kristan Markey Alt Invoice App: Ronnie "Joe" Bever The purpose of this bilateral Modification P00004 is to:							
1. Increase the ceiling for Contract Line Item Number (CLIN) 0001 from \$3,419,895.00 to \$3,421,039.00; Continued ...							
Except as provided herein, all terms and conditions of the document referenced in Item 9 A or 10A, as heretofore changed, remains unchanged and in full force and effect.							
15A. NAME AND TITLE OF SIGNER (Type or print)				16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print) Sean Gifford			
15B. CONTRACTOR/OFFEROR (Signature of person authorized to sign)		15C. DATE SIGNED		16B. UNITED STATES OF AMERICA  (Signature of Contracting Officer)		16C. DATE SIGNED 09/28/2021	

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ITEM NO. (A)	SUPPLIES/SERVICES (B)	QUANTITY (C)	UNIT (D)	UNIT PRICE (E)	AMOUNT (F)
	<p>2. Shift funds in the amount of \$104,586.00 from Base Period to multiple CLINs as shown below:</p> <p>CLIN 0001: \$1,144.00 CLIN 0007: -\$4,923.00 CLIN 0008: -\$3,392.00 CLIN 0012: -\$42,993.00 CLIN 0013: -\$31,306.00 CLIN 0018: -\$5,812.00 CLIN 0019: -\$16,160.00 CLIN 0022: \$50,000.00 CLIN 0028: \$25,000.00 CLIN 0032: \$28,442.00</p> <p>The resulting total funding for all affected CLINs after shift of funds is provided below:</p> <p>CLIN 0001: \$3,421,039.00 CLIN 0007: \$39,508.00 CLIN 0008: \$43,309.00 CLIN 0012: \$0.00 CLIN 0013: \$94,519.00 CLIN 0018: \$92,004.00 CLIN 0019: \$92,180.00 CLIN 0022: \$300,000.00 CLIN 0028: \$25,000.00 CLIN 0032: \$28,442.00</p> <p>LIST OF CHANGES: Reason for Modification: Funding Only Action Total Amount for this Modification: \$1,144.00 New Total Amount for this Version: \$18,354,741.00 New Total Amount for this Award: \$18,354,741.00</p> <p>CHANGES FOR LINE ITEM NUMBER: 0001 Total Amount changed from \$3,419,895.00 to \$3,421,039.00 Obligated Amount for this Modification: \$1,144.00</p> <p>CHANGES FOR DELIVERY LOCATION: OCSPP RIOS Amount changed from \$3,419,895.00 to \$3,421,039.00</p> <p>NEW ACCOUNTING CODE ADDED: Account code: 20-21-B-C2-000C54-2505-2032IO0034-001 Beginning FiscalYear 20 Ending Fiscal Year 21 Fund (Appropriation) B Budget Organization C2 Continued ...</p>				

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ITEM NO. (A)	SUPPLIES/SERVICES (B)	QUANTITY (C)	UNIT (D)	UNIT PRICE (E)	AMOUNT (F)
	Program (PRC) 000C54 Budget (BOC) 2505 Job # (Site/Project) Cost Organization DCN-LineID 2032IO0034-001 Quantity: 0 Amount: \$1,144.00 Percent: .03344 Subject To Funding: N Payment Address: CHANGES FOR LINE ITEM NUMBER: 0007 Obligated Amount for this Modification: -\$4,923.00 CHANGES FOR ACCOUNTING CODE: 20-21-B-C2-000C54-2505-2032IO0034-001 Amount changed from \$44,431.00 to \$39,508.00 CHANGES FOR LINE ITEM NUMBER: 0008 Obligated Amount for this Modification: -\$3,392.00 CHANGES FOR ACCOUNTING CODE: 20-21-B-C2-000C54-2505-2032IO0034-001 Amount changed from \$46,701.00 to \$43,309.00 CHANGES FOR LINE ITEM NUMBER: 0012 Obligated Amount for this Modification: -\$42,993.00 CHANGES FOR ACCOUNTING CODE: 20-21-B-C2-000C54-2505-2032IO0034-001 Amount changed from \$42,993.00 to \$0.00 CHANGES FOR LINE ITEM NUMBER: 0013 Obligated Amount for this Modification: -\$31,306.00 CHANGES FOR ACCOUNTING CODE: 20-21-B-C2-000C54-2505-2032IO0034-001 Amount changed from \$125,825.00 to \$94,519.00 CHANGES FOR LINE ITEM NUMBER: 0018 Obligated Amount for this Modification: -\$5,812.00 CHANGES FOR ACCOUNTING CODE: 20-21-B-C2-000C54-2505-2032IO0034-001 Amount changed from \$49,392.00 to \$43,580.00 CHANGES FOR LINE ITEM NUMBER: 0019 Obligated Amount for this Modification: Continued ...				

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ITEM NO. (A)	SUPPLIES/SERVICES (B)	QUANTITY (C)	UNIT (D)	UNIT PRICE (E)	AMOUNT (F)
	<p>-\$16,160.00</p> <p>CHANGES FOR ACCOUNTING CODE: 21-22-B-32-000C54-2505-2032IO0034-002 Amount changed from \$108,340.00 to \$92,180.00</p> <p>CHANGES FOR LINE ITEM NUMBER: 0022 Obligated Amount for this Modification: \$50,000.00</p> <p>NEW ACCOUNTING CODE ADDED: Account code: 20-21-B-C2-000C54-2505-2032IO0034-001 Beginning FiscalYear 20 Ending Fiscal Year 21 Fund (Appropriation) B Budget Organization C2 Program (PRC) 000C54 Budget (BOC) 2505 Job # (Site/Project) Cost Organization DCN-LineID 2032IO0034-001 Quantity: 0 Amount: \$50,000.00 Percent: 6.25156 Subject To Funding: N Payment Address:</p> <p>CHANGES FOR LINE ITEM NUMBER: 0028 Obligated Amount for this Modification: \$25,000.00 Exercised option</p> <p>NEW ACCOUNTING CODE ADDED: Account code: 20-21-B-C2-000C54-2505-2032IO0034-001 Beginning FiscalYear 20 Ending Fiscal Year 21 Fund (Appropriation) B Budget Organization C2 Program (PRC) 000C54 Budget (BOC) 2505 Job # (Site/Project) Cost Organization DCN-LineID 2032IO0034-001 Quantity: 0 Amount: \$25,000.00 Percent: 50.40018 Subject To Funding: N Payment Address:</p> <p>CHANGES FOR LINE ITEM NUMBER: 0032 Continued ...</p>				

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ITEM NO. (A)	SUPPLIES/SERVICES (B)	QUANTITY (C)	UNIT (D)	UNIT PRICE (E)	AMOUNT (F)
	<p>Obligated Amount for this Modification: \$28,442.00</p> <p>Exercised option</p> <p>NEW ACCOUNTING CODE ADDED:</p> <p>Account code:</p> <p>20-21-B-C2-000C54-2505-2032IO0034-001</p> <p>Beginning FiscalYear 20</p> <p>Ending Fiscal Year 21</p> <p>Fund (Appropriation) B</p> <p>Budget Organization C2</p> <p>Program (PRC) 000C54</p> <p>Budget (BOC) 2505</p> <p>Job # (Site/Project)</p> <p>Cost Organization</p> <p>DCN-LineID 2032IO0034-001</p> <p>Quantity: 0</p> <p>Amount: \$12,282.00</p> <p>Percent: 26.89587</p> <p>Subject To Funding: N</p> <p>Payment Address:</p> <p>NEW ACCOUNTING CODE ADDED:</p> <p>Account code:</p> <p>21-22-B-32-000C54-2505-2032IO0034-002</p> <p>Beginning FiscalYear 21</p> <p>Ending Fiscal Year 22</p> <p>Fund (Appropriation) B</p> <p>Budget Organization 32</p> <p>Program (PRC) 000C54</p> <p>Budget (BOC) 2505</p> <p>Job # (Site/Project)</p> <p>Cost Organization</p> <p>DCN-LineID 2032IO0034-002</p> <p>Quantity: 0</p> <p>Amount: \$16,160.00</p> <p>Percent: 35.38815</p> <p>Subject To Funding: N</p> <p>Payment Address:</p> <p>Payment:</p> <p>RTP Finance Center</p> <p>US Environmental Protection Agency</p> <p>RTP-Finance Center (AA216-01)</p> <p>109 TW Alexander Drive</p> <p>www2.epa.gov/financial/contracts</p> <p>Durham NC 27711</p> <p>Period of Performance: 09/27/2019 to 09/26/2022</p>				